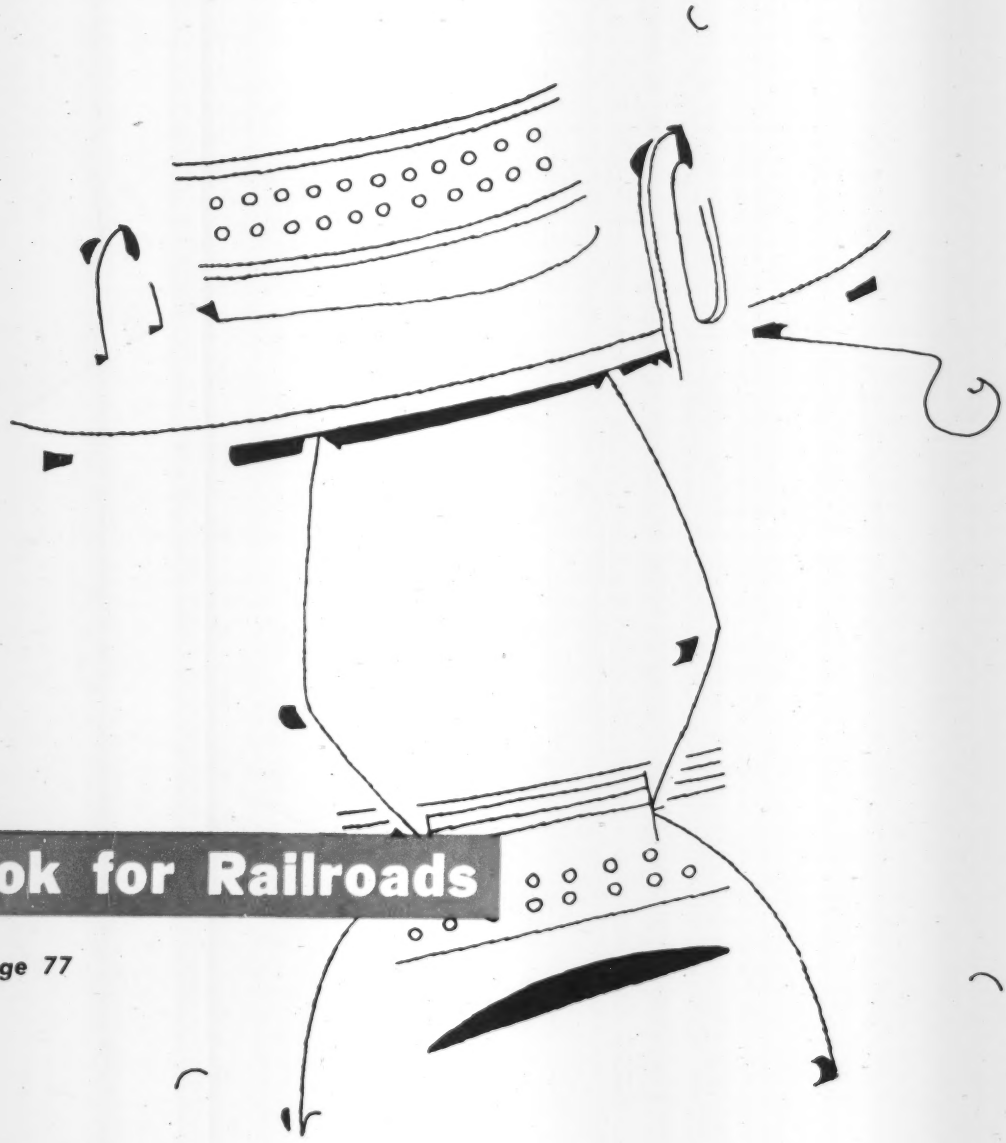
DECEMBER 14, 1953

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Outlook for Railroads

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✓ **UAW TALKS ABOUT 1955**
And the Guaranteed Wage, p. 78

✓ **TWO APPROACHES TO MECHANIZATION**
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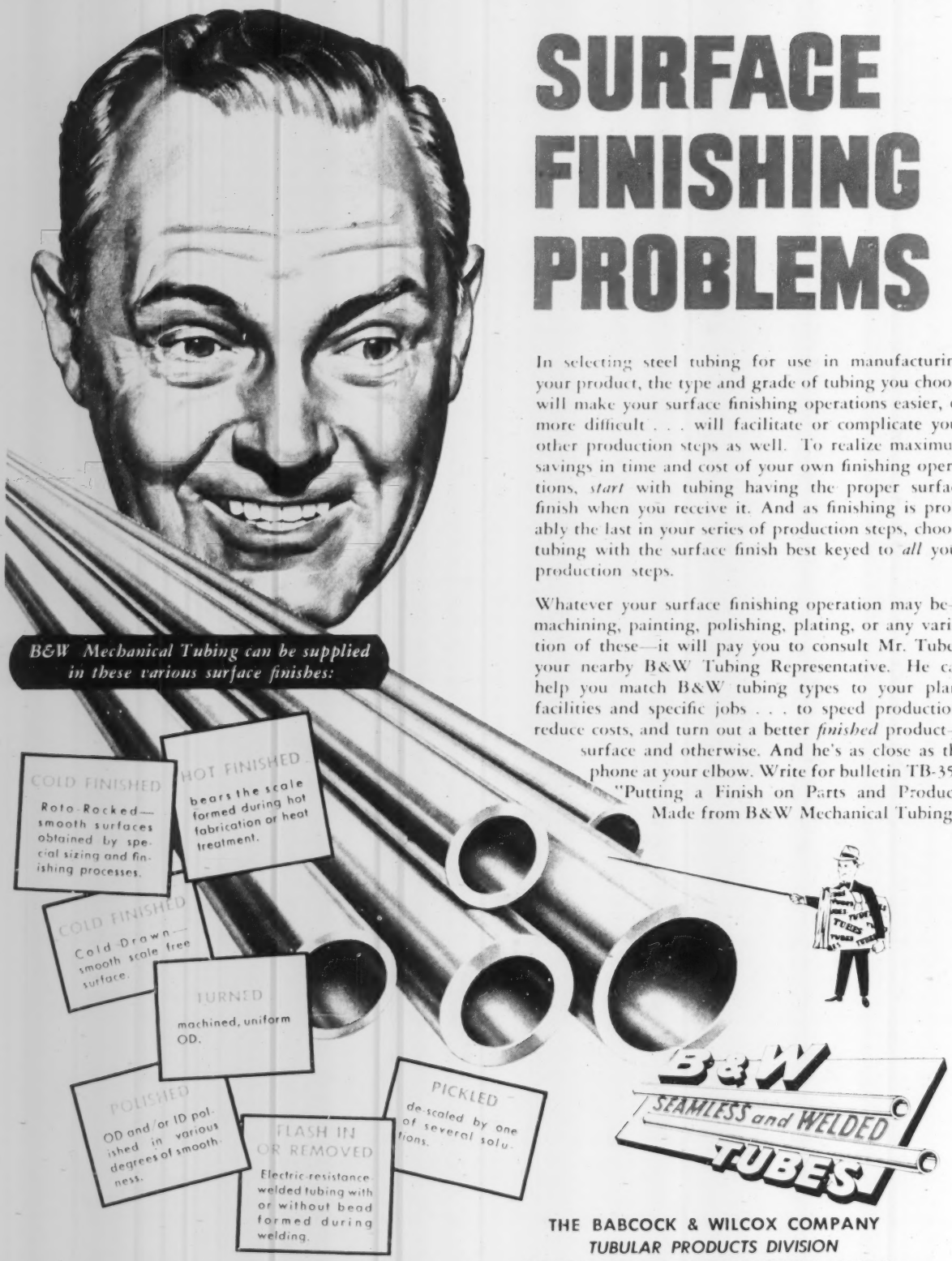
Take a closer look at your

SURFACE FINISHING PROBLEMS


B&W Mechanical Tubing can be supplied in these various surface finishes:
COLD FINISHED
Roto-Rocked—smooth surfaces obtained by special sizing and finishing processes.
HOT FINISHED
bears the scale formed during hot fabrication or heat treatment.
COLD FINISHED
Cold Drawn—smooth scale free surface.
TURNED
machined, uniform OD.
POLISHED
OD and/or ID polished in various degrees of smoothness.
FLASH IN OR REMOVED
Electric-resistance welded tubing with or without bead formed during welding.
PICKLED
de-scaled by one of several solutions.
B&W
SEAMLESS and WELDED
TUBES

In selecting steel tubing for use in manufacturing your product, the type and grade of tubing you choose will make your surface finishing operations easier, or more difficult . . . will facilitate or complicate your other production steps as well. To realize maximum savings in time and cost of your own finishing operations, *start* with tubing having the proper surface finish when you receive it. And as finishing is probably the last in your series of production steps, choose tubing with the surface finish best keyed to *all* your production steps.

Whatever your surface finishing operation may be—machining, painting, polishing, plating, or any variation of these—it will pay you to consult Mr. Tubes, your nearby B&W Tubing Representative. He can help you match B&W tubing types to your plant facilities and specific jobs . . . to speed production, reduce costs, and turn out a better *finished* product—surface and otherwise. And he's as close as the phone at your elbow. Write for bulletin TB-350 "Putting a Finish on Parts and Products Made from B&W Mechanical Tubing."

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA 1752(M)

FLANGED-AND-DISHED HEADS Bethlehem spins or presses eight different types of Heads—flanged-only, elliptical, tank-car, obround-tank, double-dished, standard, shallow and ASME Code flanged-and-dished. Diameters of Bethlehem Heads range up to 144 ins; thicknesses range from $\frac{1}{8}$ in. to $3\frac{1}{2}$ in. We also produce a full line of standard manholes and covers, hand holes and covers, flue holes, collar flanges and pipe flanges. Tell us about your requirements, regardless of quantity. Please write direct to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor*: Bethlehem Steel Export Corporation

America's Largest Selling Brand of L.P.-Gas...

PHILGAS*

For Industries

Why do so many leading manufacturers rely on Philgas? Because this high-quality butane-propane fuel burns clean, there are no harmful contaminants to injure finished products. Fewer operational worries, too, with automatic Philgas systems maintaining constant temperature, atmosphere and pressure (high or low, as desired).

For Utilities

What advantages does Philgas offer utilities? Again . . . Philgas can be depended upon as a superior, reliable product . . . clean-burning and uniform in thermal values and gravity. Many progressive utilities find it profitable to augment natural or manufactured gas with Philgas. Automatic operation cuts down overhead.

*Philgas is the Phillips Petroleum Company trademark for its high quality propane-butane LP-Gas or bottled gas.

Phillips 66 Philgas
THE ALL-PURPOSE FUEL

PHILLIPS PETROLEUM COMPANY
Sales Department · Bartlesville, Oklahoma

Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kans.

Cut Your Costs with the New HOBART arc welders

Here's a line of welders that will speed production, cut costs on the toughest production or construction jobs and give you top welder performance. The best proof of Hobart's bigger values — is a comparison with others.

GAS DRIVE MODELS — are most complete welder units available. Have push button starters, fly ball governor, idling device, 1 — 3 or 12 KW auxiliary power outlets, multi-range dual control, remote control, 300, 400, 600 amp. capacity.

NEW "HUSKY BOY" — a 200 ampere, air cooled, gas driven welder. Designed to meet general shop and outside repair work. Does a real job on profitable emergency service. Can be easily moved on pick-up truck.

ELECTRIC DRIVE MODELS — for production maintenance and repair welding in both large and small plants. "Simplified" controls insure quality welding with greater speed. A size for every job. Available in 200, 300, 400 and 600 amp. capacity.

Try this **HOBART #10 electrode E-6010**

FREE samples on request

It's an all-position, general purpose electrode, ideal for pipe lines, structural steel, boilers, tanks, ship building, freight cars, etc. Gives stronger welds, deeper penetration and less spatter.

Use coupon for samples.

Hobart "One of the world's largest builders of arc welding equipment."

HOBART BROTHERS COMPANY, Box ST-123, TROY, OHIO

Please send without obligation information on items checked below:

☐ Electric Drive Welder ☐ Husky Boy ☐ Gas Drive Welder

Send me:

☐ Welder Cat. ☐ Electrode Cat. ☐ Accessory Cat.

☐ Send me FREE sample of #10 Electrode (E-6010)

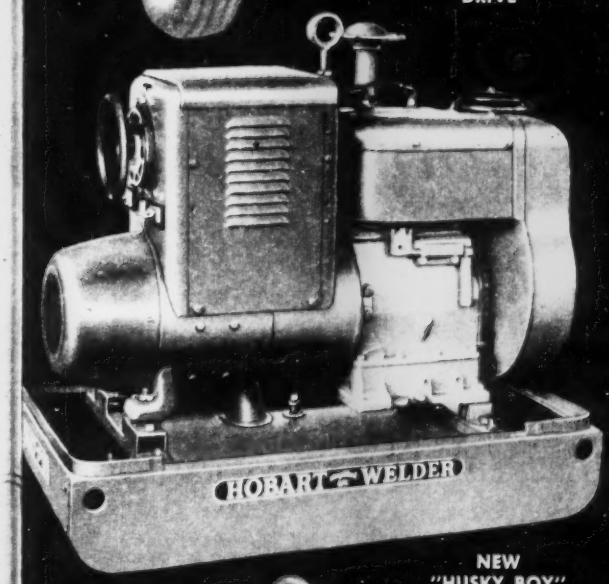
NAME _____ POSITION _____

FIRM _____

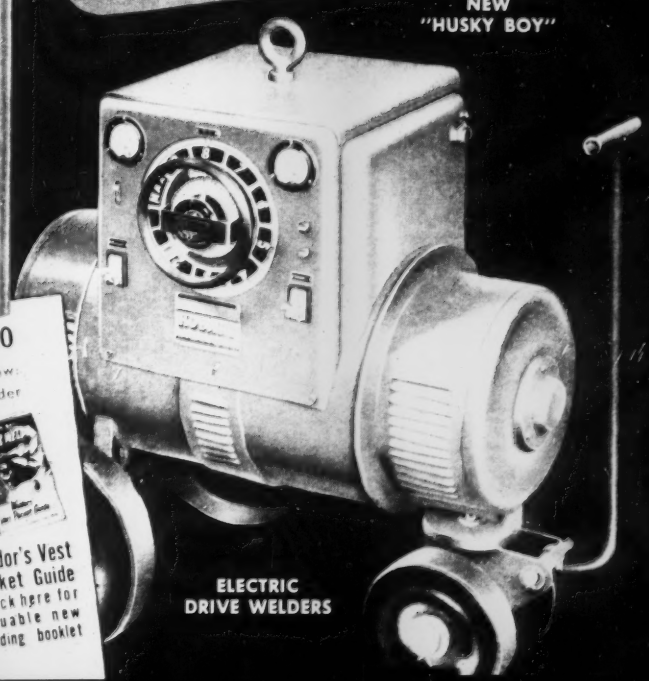
ADDRESS _____

☐ Weldor's Vest Pocket Guide
Check here for valuable new welding booklet

GAS ENGINE DRIVE



NEW "HUSKY BOY"



ELECTRIC DRIVE WELDERS

HOBART ARC WELDERS

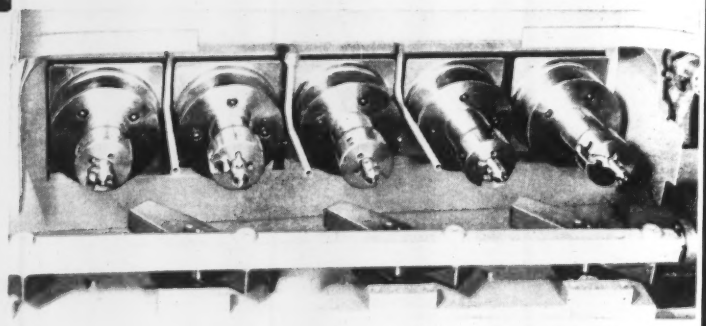
80 SURFACES IN 1 CYCLE

EX-CELL-O

MACHINE BORES, COUNTERBORES, FACES AND CHAMFERS 20 HOLES

This Ex-Cell-O Precision Boring Machine performs operations on 80 surfaces in one cycle on the projecting holes of a cotton picker bar assembly. Five spindles on the machine bridge are positioned to engage every fourth hole. The fixture indexes automatically between machining strokes to align the next set of holes with the boring bars.

The machine is a standard Style 112-C having a heavy well-ribbed base and table, long stroke; handles medium-sized and large work.



Ex-Cell-O's line of standard Precision Boring Machines is exceptionally complete. Ask your local Ex-Cell-O representative about them, or write to Ex-Cell-O in Detroit for Catalog 31205.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

XLO
EX-CELL-O for PRECISION

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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This Week in Metalworking

STEEL

Vol. 133 No. 24 December 14, 1953

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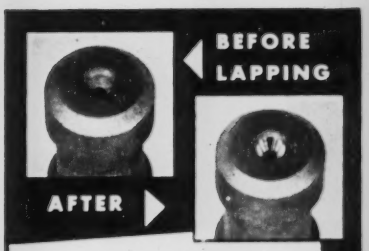
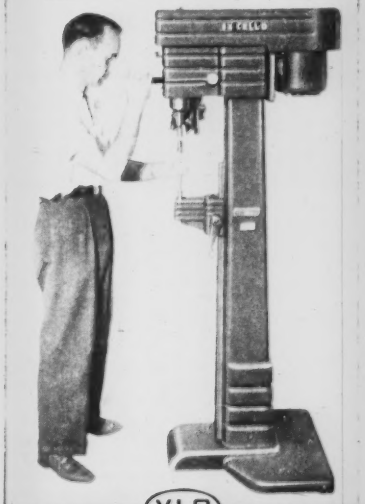


PROBLEM:
To get accurate positioning from female centers.

ANSWER:
LAP THE CENTERS

Ex-Cell-O Center Lapping Machines correct inaccuracies of rough centers, assuring GREATER PRECISION from your present equipment. They are easy to operate. Center Lapping reduces manufacturing costs by minimizing waste from grinding rejection; shortens assembly time because of closer tolerances. All the facts are in Bulletin No. 40271. Write for a copy.



53-28 XLO

CENTER LAPPING MACHINES
BY
EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

(Advertisement)

what's NEW in Engineering

A synthetic soil conditioner has been announced which helps to control rain and wind erosion on construction sites, levees, rights of way and similar "bare ground" sites. Designed to stabilize aggregates on the soil surface, it helps to hold seeds and soil in place until vegetation cover takes over the job.

Deep-sea divers joined a small army of engineers and construction crews in driving over 42,000 piles at a riverside site for a Louisiana plant to provide a stable foundation in mushy ground. Divers, working 40 feet down in the Mississippi River, were required to direct

placement of the concrete seal. We'll send you a 32 page illustrated book which tells how Kaiser Engineers is equipped to meet challenging problems like this one at the nation's largest aluminum plant, which was producing metal in just 40 months.

A pocket pyrometer, now on the market, gives direct reading of temperatures up to 3,300 deg. F. Only six and one-half inches long, it weighs about five ounces, and is shaped like a miniature telescope.

Whether it's designing an oil refinery, building a porcelain enameling plant or laying out a site plan, Kaiser Engineers undertakes the job with assurance because of the variety of talent within the organization. Successful experience in a wide field of design, engineering and construction tells the story. Call or write Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

behind the scenes

Covering the Covers

How do you like STEEL's covers?

STEEL is the only weekly metalworking publication and one of the *very* few weekly business papers which prepares an original cover each week.

Each of these is a carefully designed piece of news-art which attempts to serve a functional as well as an aesthetic purpose. Weekly meetings are held with editors and art department specialists for the purpose of reviewing the cover stories and developing their subsequent art treatment.

It is axiomatic that the covers must tell a story first and be attractive second. It is not enough, however, to tell a story in a conventional or trite manner. To avoid stereotypes, a variety of art forms such as pictograms, combination plates, montages, cartoons, duotone and four-color process are used.

STEEL always employs a minimum of three colors on its covers. . . color is always used functionally rather than for eye dressing.

The covers are the outside wrapping of the package and, as such, must reflect the editorial tone of the contents. They must be modern, to the point, distinctive, interesting, inviting.

There's a lot of work goes into them thar covers. Just thought you'd be interested in knowing a little more about it.

What's with 1954?

The best indicator of the trends in business is what businessmen themselves are thinking and planning. That's exactly what STEEL will attempt to determine and report in its 1954 edition of the *Metalworking Yearbook* scheduled for publication on Jan. 1.

Our editorial staff is currently up to its knees in questionnaire returns from a specially designed survey calculated to develop "What the Metalworking Industry Expects in 1954." Under this title, the *Yearbook* will carry a complete report and analysis reflecting the thinking of thousands of metalworking management, production, engineering and purchasing executives. Graphs, pictograms and charts will tell the story quickly yet thoroughly.

As in previous *Metalworking Yearbooks*, the survey will cover such critical subjects as expectations in business volume, employment, manufacturing costs, selling prices, sales and distribution costs, plant expansions and equipment purchases.

If we may be permitted, a proud puffing of the chest, may we point to the fact that STEEL's editorial surveys have gained an industry-wide reputation for calling the turn more accurately than most professional prognosticators. And why shouldn't they? They are, after all, the mirrored thinking of you, our readers.

At Your Service

Our Readers' Service Department is a quiet, efficiently operating department that goes about its job of helping you folks dig out answers to myriad questions which pop up in your work each day. Requests for tear sheets, reprints, marketing information, names, addresses, buyers' guide information, whodunits, are all just part of the day's work.

Occasionally, on a blue, blue Monday, a letter like this one is dropped on the pile:

"We are, at present, studying at school in North American Geography, shipping on the Great Lakes. Could you please send me the following literature, or any allied information:

1. A map showing the movement of steel and/or iron ore on the Great Lakes.
2. A pamphlet on elementary steel production.
3. Illustrations and/or information on ore-boats.
4. A second map showing world shipping and transporting of steel.
5. An Industrial Concentration Chart of North America.

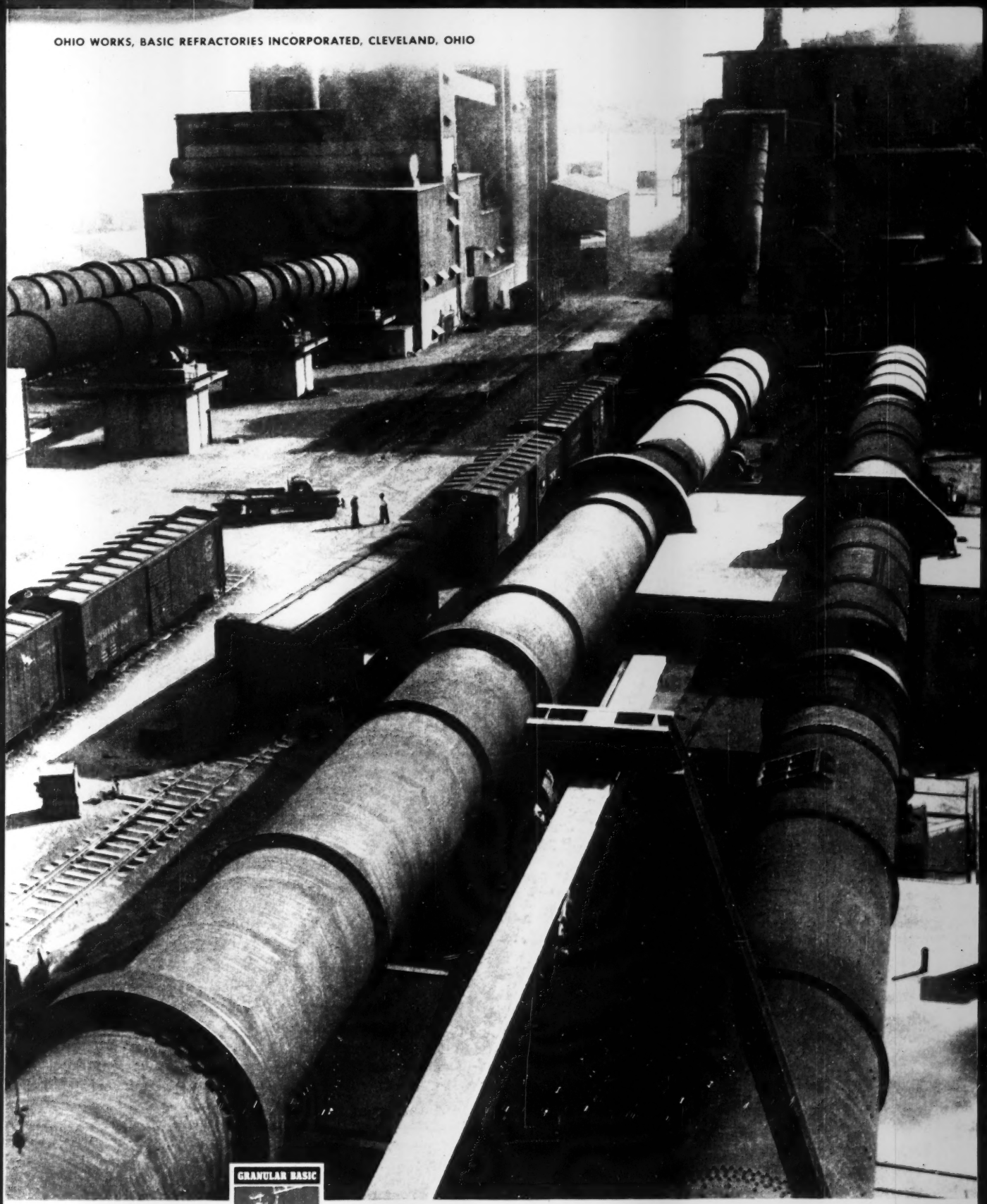
Thanking you in anticipation of receiving this or any other information, I remain

Yours truly,"

As we stated earlier, our Readers' Service Department welcomes the opportunity to be helpful, but GAD!

Shrdlu

(Metalworking Outlook—Page 69)

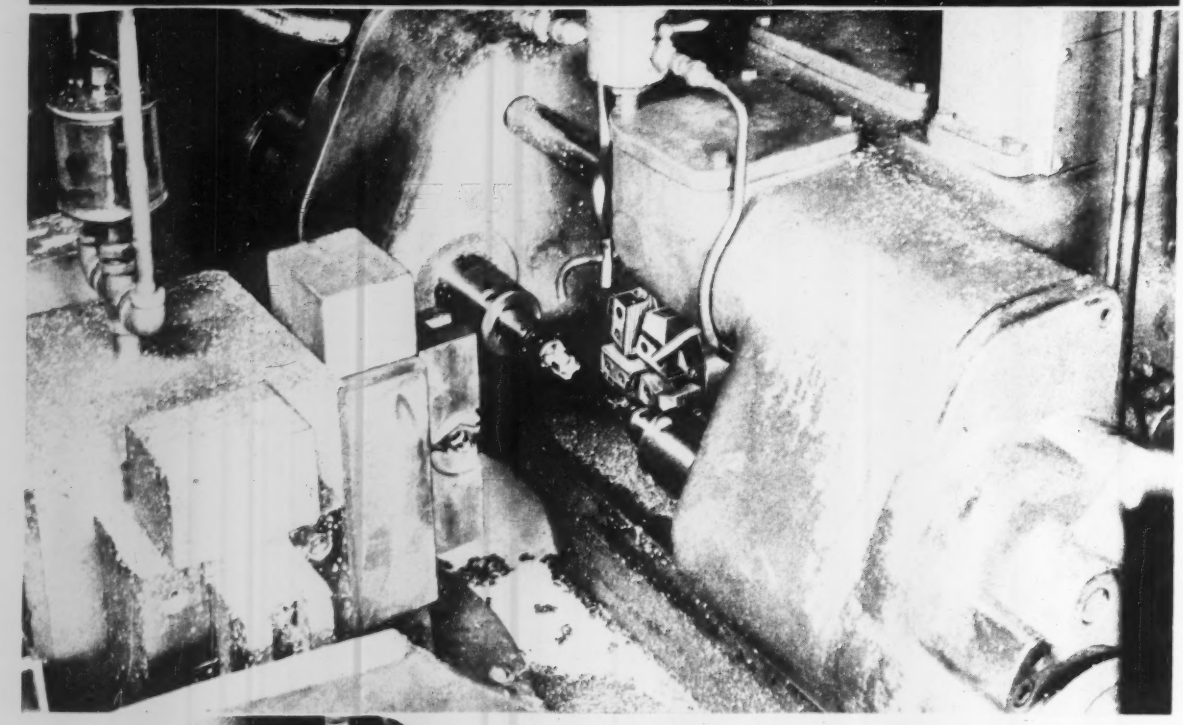


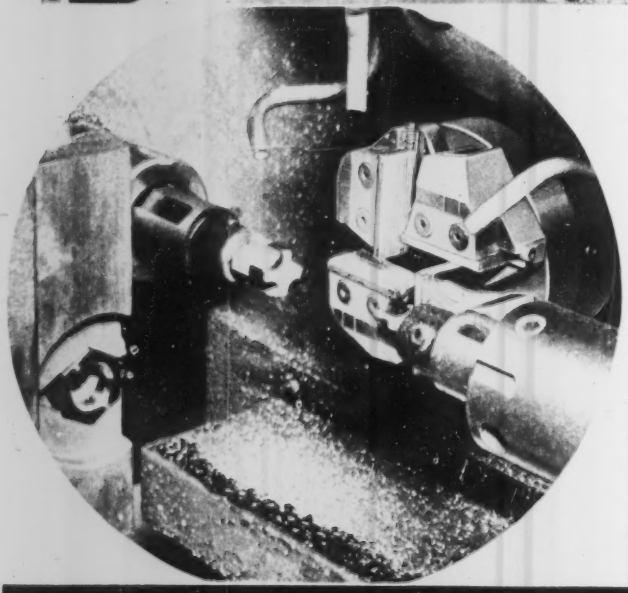
GRANULAR BASIC

REFRACTORIES

"A good Workman is Known by His Tools"

57% Less Threading Cost
ON AUTOMATIC CHUCKING MACHINE





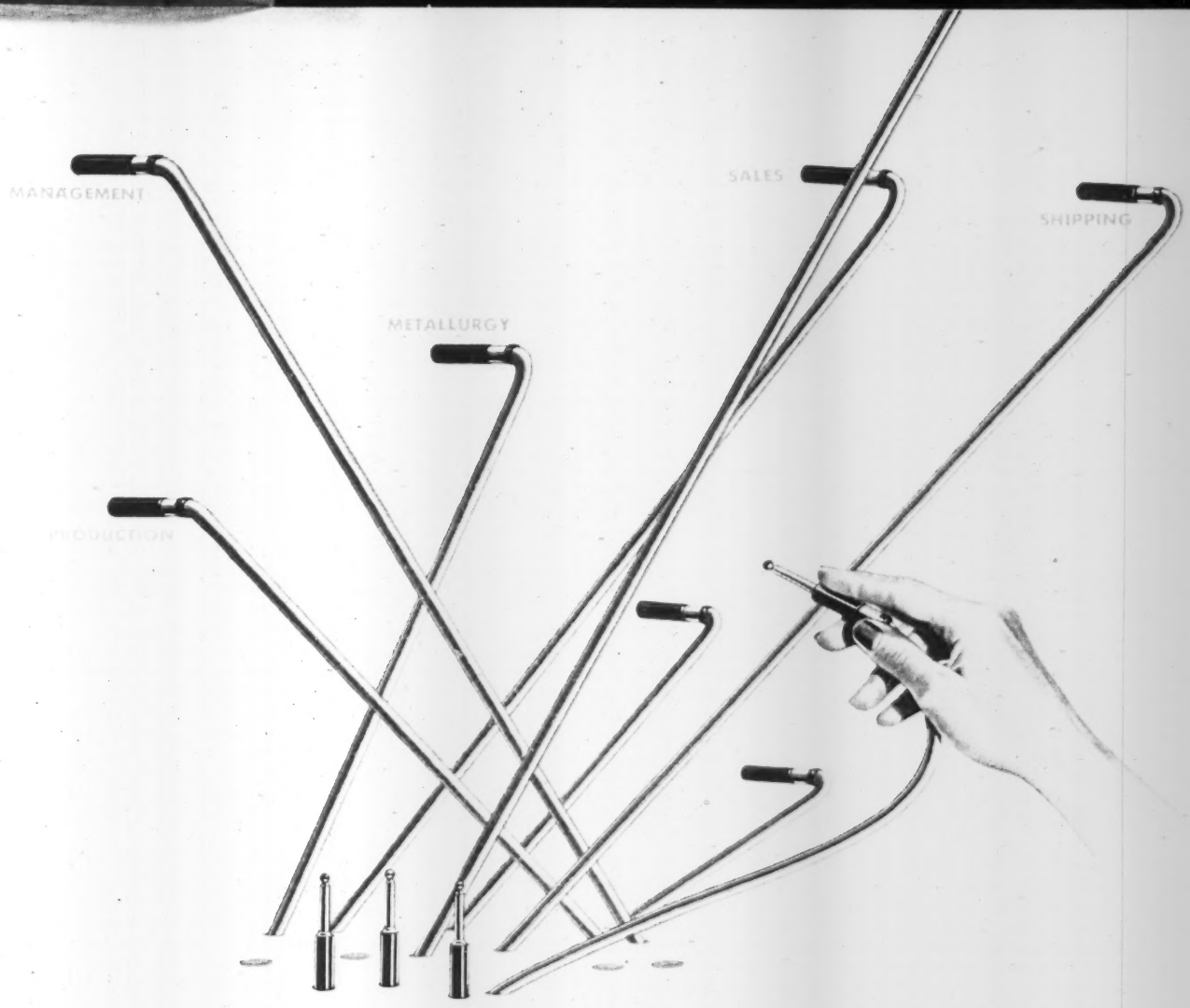
A *LANDIS* Solid Adjustable Die Head cut the cost of one threading operation in the plant of a large Middle Western manufacturer by 57%.

The operation, performed on a Goss and DeLeeuw Automatic Chucking Machine, required the cutting of a 1 11/16" diameter 14 pitch thread ½" long on cast brass valve bodies. Prescribed tolerances were easily maintained.

The *LANDIS* Head fit perfectly into the highspeed cycle of the chucking machine, and produced an average of 210 finished pieces per hour, revolving at 385 RPM. Major factors in the efficiency of this *LANDIS* Head were low down-time and low tool cost, occasioned by long tool life. Output of finished pieces averaged from 4,000 to 5,000 between chaser grindings.

Please send job and machine specifications with your request for additional information.

THE LANDIS *Machine* CO. 50TH ANNIVERSARY **WAYNESBORO PENNSYLVANIA**



FACED WITH A STEEL PROBLEM ?

One moment please . . .

Your steel problem is well on its way toward being solved the moment the Weirton switchboard operator makes your connection. Whether it's sales, metallurgy, production, shipping, or any combination, you have a direct line to fast action.

Fully realizing the importance of its customers' problems, Weirton has coordinated and centralized the key men in all phases of operations, under one roof. These men with the answers can get together on short notice and give you prompt attention. This unique integration assures you of quick answers when you need them to maintain production rates and meet schedules.

This method of operation was established for your benefit. When you are faced with a steel problem, pick up your phone and get all the answers . . . from Weirton.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

WHAT'S THE BEST WAY
TO APPLY ZINC PHOSPHATE
COATINGS TO STEEL?

OAKITE CRYSCOAT HC
DOES A FINE JOB FOR US*

*This comment came from a Pennsylvania munitions maker, who added that Oakite CrysCoat HC has put an excellent zinc phosphate coating on 385,000 shells with "absolutely no trouble . . . maintenance and control are very easy."

The Oakite CrysCoat HC coating on steel products—such as artillery shells, rocket fins, auto parts, etc.—weighs more than 200 milligrams per square foot. It more than meets the requirements of U.S. Government Specifications:

JAN-C-490, Grade 1 57-O-2C, Type 2, Class C
PA-PD-191, Rev. A

The Oakite CrysCoat HC Process for preparing steel for painting—either in spray washing machines or in tanks—has five big advantages:

1 The heavy CrysCoat HC coating forms a strong foundation for the lasting adhesion of paint. *See page 5 in free booklet.*

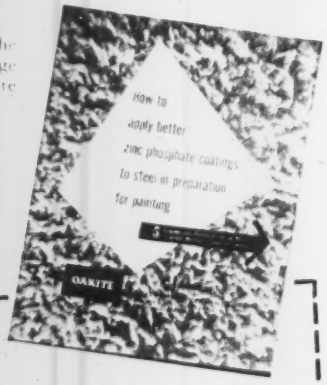
2 The heavy coating gives excellent protection against electrochemical corrosion. *See page 7.*

3 The CrysCoat HC Process is easy to control. Only one material is used for make up and up keep. No accelerators, starters, tonics or other additives are needed. Only one simple type of titration is used. *See page 9.*

4 The CrysCoat HC reaction produces relatively little sludge and scale. *See page 10.*

5 Stainless steel is not necessary for all parts of the equipment. *See page 11.*

FREE For complete information, mail the coupon for a copy of our 12-page illustrated booklet describing the Oakite CrysCoat HC Process.



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OAKITE PRODUCTS, INC.
34E Rector St., New York 6, N. Y.

Send me a FREE copy of "*How to apply better zinc phosphate coatings to steel in preparation for painting*"

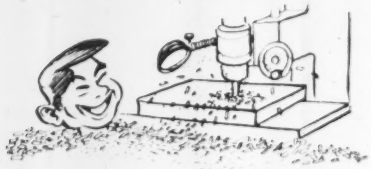
Name _____

Company _____

Address _____

LETTERS
TO THE EDITORS

Article Is in the Chips



We would like to get the booklet and wall chart which are the result of research on chip breaking, published under the auspices of the National Machine Tool Builders' Association and described in your "Technical Outlook" item, "In the Chips" (Nov. 9, p. 111).

R. C. Nickles
vice president
Nickles Machine Corp.
Ponca City, Okla.

We're interested in securing a copy for our files . . .

R. L. Kelso
department head
Tool Design Department
Rohr Aircraft Corp.
Chula Vista, Calif.

• *Copies of the booklet and wall chart can be obtained from the National Machine Tool Builders' Association, 10525 Carnegie Ave., Cleveland.—ED.*

Tool Guide Fills a Need

We have received the "Machine Tool Buyers' Guide" (Section II, Nov. 16 issue) and we feel it is an excellent publication. We would very much appreciate an additional six copies for reference use by various departments in our organization.

M. Shapiro
market analyst
Waterbury Tool
Division of Vickers Inc.
Waterbury, Conn.

Please send 10 copies . . .

R. E. Bangert
Component Products Division
General Electric Co.
Ft. Wayne, Ind.

Our need for equipment at the present time is for a machine to resharpen saws such as are used in woodworking, i.e., hand saws, circular power-driven saw blades and band saws. We saw a machine at one time using a grinding process to do this saw-sharpening job but have been unable to locate the manufacturer.

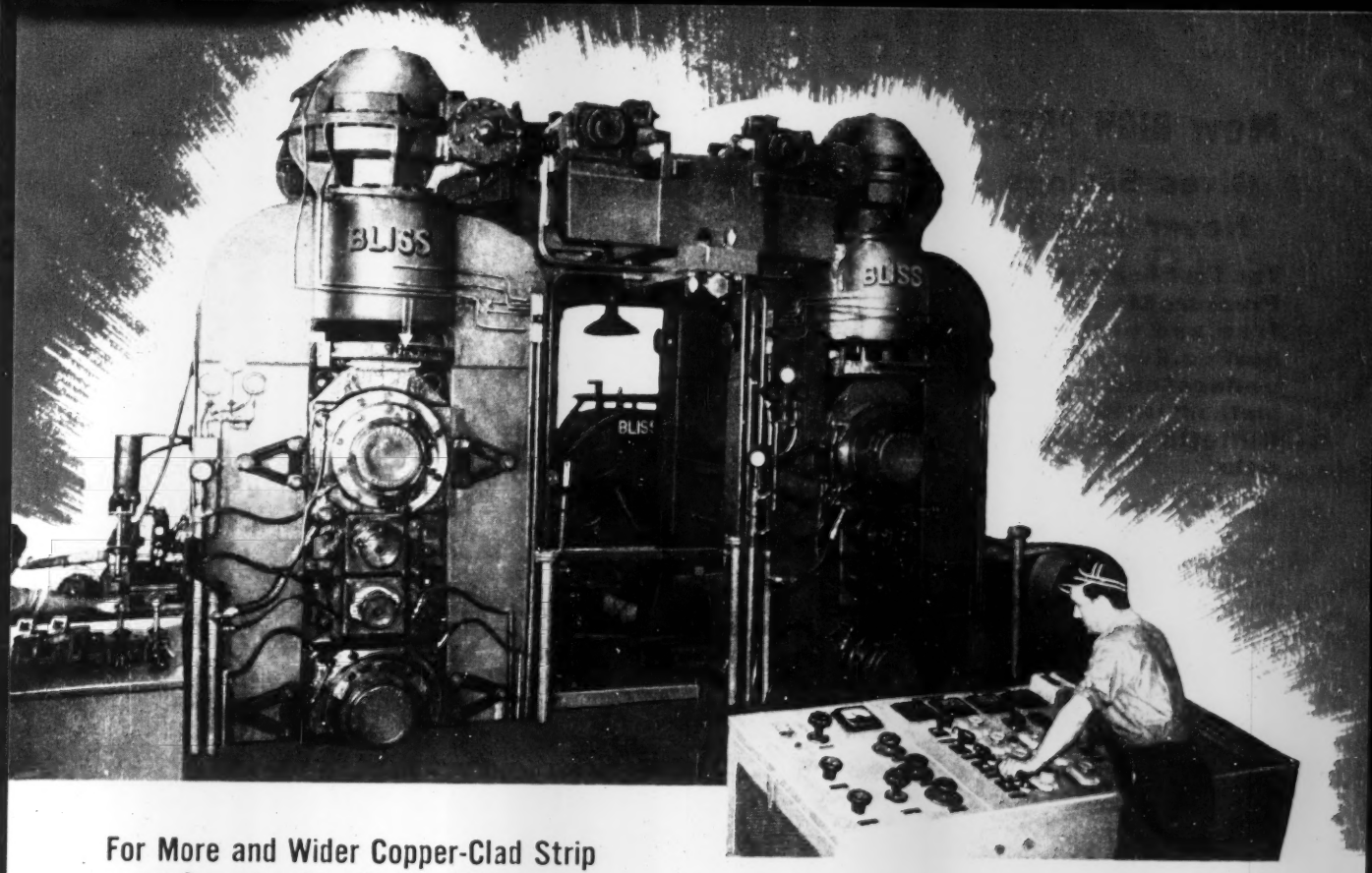
Irving H. Stamets
West Main Street
Barstow, Calif.

• *Refer to the "Machine Tool Buyers' Guide." The contents listed at the top of p. 128 with reference to saw grinders may give you the information you seek.—ED.*

While taking lunch at the Railroad Machinery Club of New York I noticed your "Machine Tool Buyers' Guide." This guide is of great interest to me for the reason that I represent a domestic machine tool distributor in this area, and Nippon Machinery Trading Co., Tokyo, which now is exporting machine tools to Japan.

I should very much like to procure a copy of the foregoing. If you will

Please turn to p. 12



For More and Wider Copper-Clad Strip
at Superior Steel's New Plant...

BLISS TWO-STAND TANDEM MILL DELIVERS THE SPEED (420 FPM) AND ACCURACY (0.0005")

At Superior Steel Corporation's big new Carnegie, Pennsylvania, plant, they're turning out more and wider clad steel strip than ever before. And plant officials cite operating speed as the big reason why.

To speed up the cold rolling end of their line, Bliss converted its two slow-speed single-stand mills into *one* two-stand four-high tandem. Now capable of cold rolling the wider strip at increased delivery speeds from 280 to 420 fpm, the Bliss tandem holds the copper-clad steel within an accuracy range of 0.0005".

Bliss also supplied all new terminal equipment, including tension reels, coil buggy, vertical belt wrapper, entry equipment and other accessories needed to facilitate fast handling.

Superior, like all leading mills in the country, often calls on Bliss rolling mill consultants for solution of mill construction and modernization problems. If you'd like to learn more about the many types of mills we have engineered all over the world, write for a copy of our revised Rolling Mill Brochure.

Remember: BLISS **for Presses, ROLLING MILLS, Special Machinery**

E. W. Bliss Company • General Office: Canton, Ohio

ROLLING MILL DIVISION: SALEM, OHIO

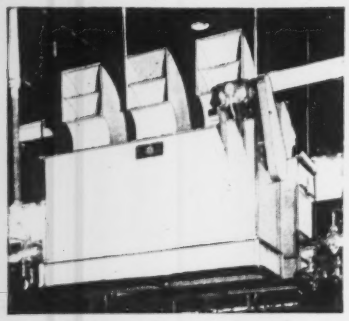
E. W. Bliss (England) Ltd., Derby, England • E. W. Bliss Company (Paris), St. Cloud sur Seine, France

U. S. Plants in Canton, Salem and Toledo, Ohio and Hastings, Michigan. Branch Offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other representatives throughout the world.

New HIGH PRESSURE STEAM Fan Heater

Gives Savings You Never Had Before

The first heater to make High Pressure Steam really trouble-free and practical in plant heating. Every engineer should understand its original method; write for Niagara Bulletin and performance data.



HOW IT OPERATES: — A dual coil system makes use of all heat, both sensible and latent. High pressure steam enters the upper coil, shown on the diagram below. Its condensate drains into a trap. Then this high pressure condensate is released into the header of the lower coil. It instantly flashes into steam at vapor pressure.

Any high pressure condensate that remains liquid is carried to the vapor condensate return header by a drain tube that also gives off its heat into the air stream.

The vapor condenses in the lower coil. Its condensate is kept at a high level in the return leg by a wier in the return header so that all its heat is made useful and it is sub-cooled by contact with the coldest air entering the heater. Vacuum condensate return to boiler is vapor free.

HOW IT SAVES IN COST: — Piping is much simpler and less costly than in low pressure systems. Much secondary piping, traps and big valves are not needed. Pipe sizes are smaller.

HOW IT SAVES IN OPERATION: — Waste is prevented. Every BTU goes where you want it. No dump traps or hot wells waste live steam.

HOW IT SAVES IN UPKEEP: — Condensate flow is even, vapor free, easily handled. No sudden surges of condensate in starting. No hammering, no hard wear and tear on system. Properly engineered for the job, final air temperatures are not excessive; heat easily directed where needed; no flashing of low pressure condensate. Heaters are self-draining on shut-down. Heaters are strongly built; all coils including the condensate drain tubes are hairpin bend, stress relieving. Use thru four heating seasons has proven these advantages in large scale plant heating.

NIAGARA

High Pressure Steam Fan Heater (Patented)

NIAGARA BLOWER COMPANY
Dept. S, 405 LEXINGTON AVE., NEW YORK 17, N. Y.

Please send Bulletin 109 on the Niagara High Pressure Steam Fan Heater.

Name .....

Address .....

LETTERS

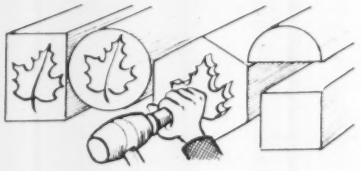
Concluded from p. 10

be kind enough to advise me as to how I can procure the publication, it will be greatly appreciated.

Harrison E. Wemett
60 Beaver St.
New York

• *Additional copies of this guide are available through* STEEL*'s Readers Service Department at $1.00 per copy.—ED.*

Canadian Birthmarking Plan



I appreciate very much your accurate coverage of our work on the identification of steels in your article "Canadian Plan for Birthmarking Steels" (Nov. 16, p. 119).

E. T. Watterud
committee secretary
Committee on Coding of Metals
Canadian Government Specifications Board
Ottawa, Ont.

Because of its interest, we would like to distribute the article to our members . . .

John R. Derrickson
executive secretary
Formed Steel Tube Institute
Cleveland

Nichrome a Trademark

As you can tell from your records, we are subscribers to your very fine publication, STEEL. We would like however, to call your attention to the article in the Oct. 12 issue, "Super-Thin Metal Sheets" (p. 338). While our technical staff found this article very interesting, we note you have used our well-known trademarked alloy, "Nichrome," as a general trade term in the same category as beryllium copper or phosphor bronze. Nichrome is the trademark of a high-nickel electrical resistance alloy, registered by us and used in the U. S. since 1908 and also registered in 44 foreign countries. Therefore, we ask that henceforth all references to Nichrome clearly show it as our trademark.

M. W. Clark
assistant secretary
Driver-Harris Co.
Harrison, N. J.

• *Sorry, our error. We will certainly honor your request.—ED.*

Who and Where Department

In the paragraph "Japan Seeks Lower Costs" (Metalworking Outlook, Aug. 24, p. 32) you mention William S. Vaughn, American adviser to Fuji Iron & Steel Co., Tokyo, Japan. I would like to get in touch with Mr. Vaughn. Can you give me a more complete address?

Harry V. Tomlinson
337 Broad St.
Butler, Pa.

• *We have no more complete address for Mr. Vaughn than Fuji Iron & Steel Co., Tokyo, Japan. We believe, however, that that address will be sufficient to reach him.—ED.*

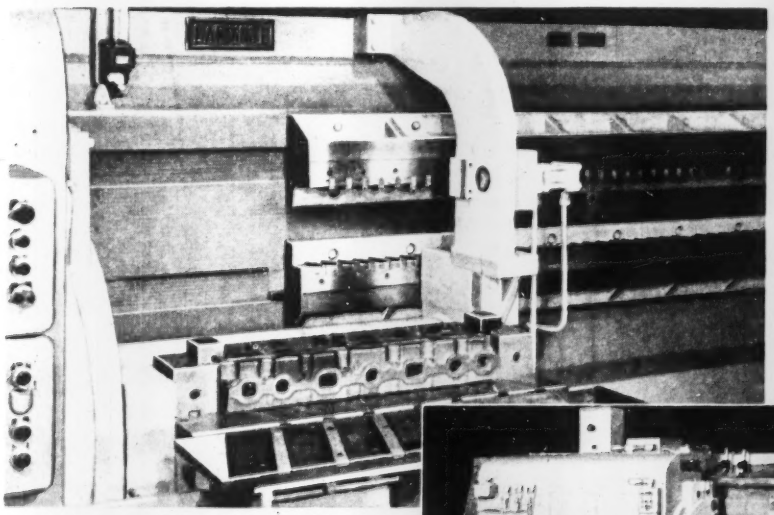
another SCOOP by LAPOINTE

Leading the field in broaching machine design and engineering, LAPOINTE'S radical, new

ELECTRO-MECHANICAL DRIVE horizontal BROACHING MACHINE

is already performing production miracles in automotive plants. Broaching speeds of 50 to 150 feet per minute are practical with conventional type broaches, but carbide-tipped broaches can be used when taking advantage of the machine's amazing broaching capacity up to 300 feet per minute . . . and more!

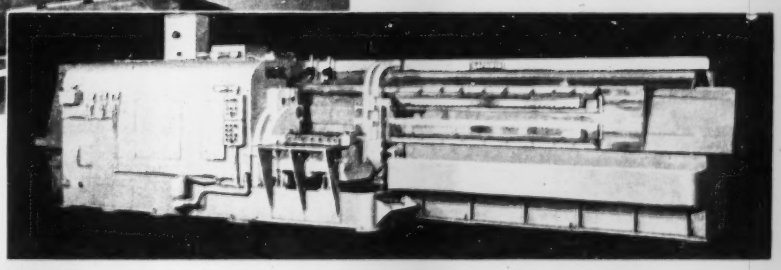
For full information, send for Bulletin **SRHE-3**



The exclusive Lapointe "Tilt-In" Fixture and work holder are hydraulically operated in synchronism with the broach assembly travel, so there is no delay awaiting the return stroke.

resulting in BIG SAVINGS for you!

Operating entirely without vibration or chatter, this Lapointe SRHE Broaching Machine, 50 hp, 150-inch stroke, removes 3/16" stock per surface on the manifold face and opposite pads on cast iron Cylinder Head parts. Return speed is 150 feet per minute. Yield is 120 completed parts per hour at 80% efficiency. This lack of vibration results in *longer tool life* of 100% or more!

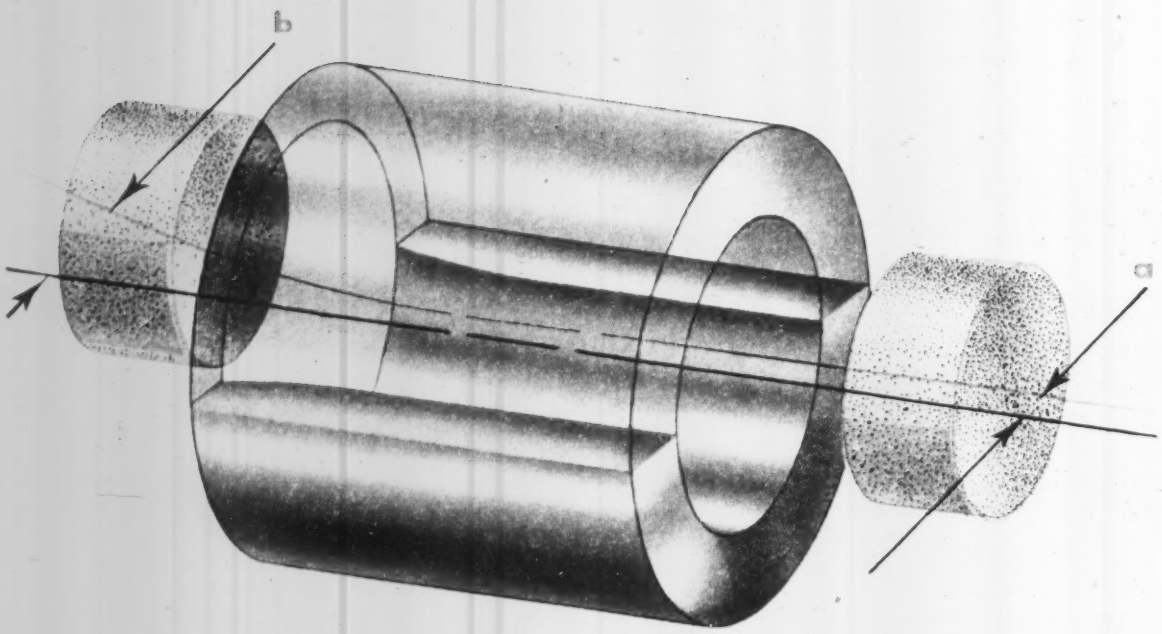


THE LAPOINTE MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS • U. S. A.
In England: Watford, Hertfordshire

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

alignment

for better internal grinding

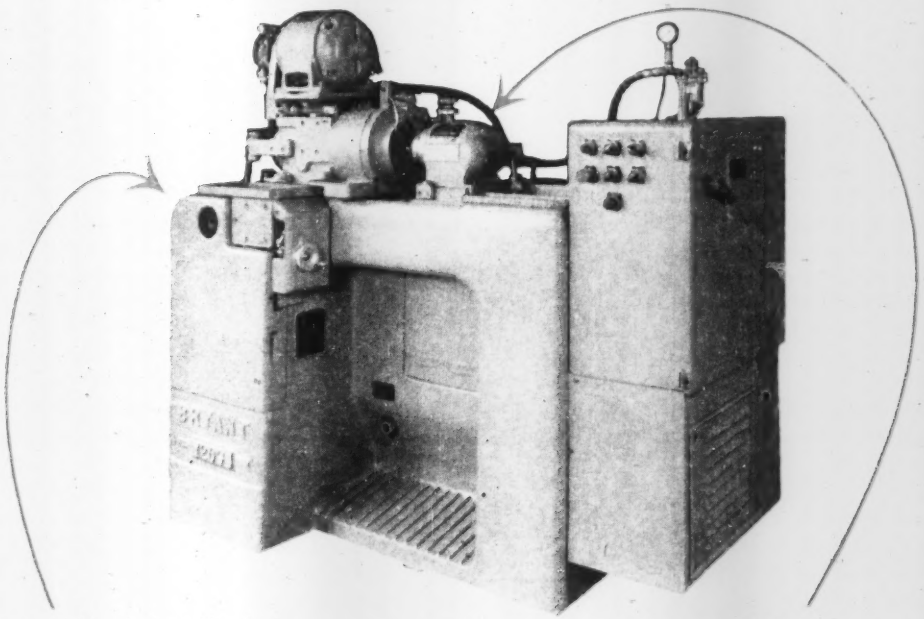


BELL mouth holes are a common internal grinding error. General available information advises simply turning the workhead or changing the length of traverse to correct this error, to generate a straight hole. In the case illustrated above, where bell mouth exists at one end of the hole, neither turning the workhead nor changing the length of stroke will correct this error.

In order to grind a straight hole the wheel must traverse the work in a straight line parallel to the axis of the work. The wheel path (the line in which the wheel traverses) is controlled by the slides under the wheelhead. If the slides are straight and true, the wheel path will be a straight line. If the path of the wheel varies from a straight line, the variation will be generated in the work.

At point "a" the wheel path and axis of the work are parallel and the wheel is set to grind a straight hole. Because of an error in the wheelslide

ways, the wheel path is distorted and the wheel is plunged into the back end of the work and the wheel path and work axis diverge as shown at point "b". Wheelslide error can introduce distortion of many types within the work in addition to the one illustrated. The remedy is to correct the wheelslide ways which will, in turn, straighten the wheel path. The wheel contact will be improved, resulting in better finish.



Left end of workhead may be raised or lowered to bring its axis into a plane parallel with wheelslide bar.

Rear of wheelslide may be adjusted to insure straight line motion of the wheel.

This machine is designed particularly for high production, precision grinding of bores up to 3" in ball bearing races, gears, rolls, bushings, etc. Operator merely loads work, trips a valve to start cycle and unloads the finished piece. The machine automatically rough grinds, finish grinds and returns to chucking position when finished size is reached. Wheelslide traverse is hydraulically operated, providing infinite traverse speeds and assuring smooth oscillation. Wheel speeds up to 100,000 R.P.M. are obtained with the Bryant Hi-Frequency Wheelhead. Write for folder.

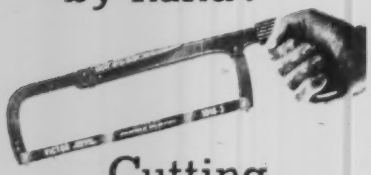
Write for "Alignment" booklet which gives complete details on this interesting subject. Also ask for booking form on new sound, color movie — free showings arranged for engineering groups.

Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

Internal Grinders • Boring Machines • Internal & External Thread Gages • Granite Surface Plates

Cutting by hand?



Cutting by power?

Cutting with bandsaws?

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For over half a century, quality has made VICTOR Blades the blades industry prefers—for hand, power or bandsaw work, for the tough jobs as well as the easy ones.

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New facts for your file on

U·S·S HIGH STRENGTH STEELS

USS HIGH STRENGTH STEELS — UNITED STATES STEEL — TWENTY YEARS OF PERFORMANCE

U·S·S MAN-TEN steel gives heavy-duty earth moving equipment the stamina to stay on the job

● By building maximum strength and durability into parts ordinarily prone to failure through the use of U S S MAN-TEN steel, Allis-Chalmers has ensured a high degree of productivity and profitable performance for their TW-300 Motor Wagon.

Used in the sides, ends and bottoms of the bowl of this big capacity, hydraulically operated bottom dump wagon, MAN-TEN steel increases strength 50%, over carbon steel construction, provides 50% higher fatigue strength, materially increases resistance to abrasion and to sudden blows in loading. An added advantage is increased resistance to atmospheric corrosion—4 to 6 times that of carbon steel.

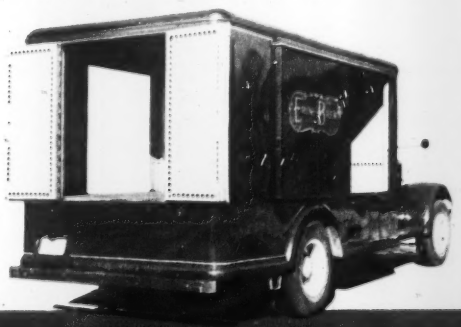
As a result, break downs and time-out for repairs are reduced to a minimum, as are maintenance and replacement costs.

In mass-produced truck body members, U·S·S COR-TEN steel saves weight, adds strength, facilitates accurate construction

By mass-producing standardized truck body shapes and sections that can be readily and quickly assembled, Parish Pressed Steel Company, Reading, Pa., has made it possible for local body builders to turn out steel truck bodies to meet individual truck owners' requirements at high speeds and low cost.

The use of U·S·S COR-TEN high strength steel in these prefabricated body sections not only permits light, strong and very durable construction, but because of the high physical properties of this steel and its consistent uniformity, it is possible to hold designs to exact limits and very close tolerances. Over-all results are much better than when less efficient materials are used.

With U·S·S COR-TEN steel construction like this, the body builder benefits because his operations are speeded up and his assembly costs are reduced. The truck owner benefits because he gets a truck that, while light in weight, has maximum strength and durability, is readily repaired if damaged and requires minimum maintenance.



WHAT IS U·S·S COR-TEN HIGH STRENGTH STEEL?

U·S·S COR-TEN is a ductile, low-carbon chromium-nickel-silicon-copper-phosphorous steel having a yield point of 50,000 psi min., and a tensile strength of 70,000 psi min. in thicknesses ½" and under.

Its resistance to abrasion and shock is superior to structural carbon steel; its fatigue resistance—that is, its ability to withstand repeated stresses—is 60% greater.

What particularly distinguishes U·S·S COR-TEN steel is its unusually high resistance to atmospheric corrosion—4 to 6 times that of plain steel, 2 to 3 times that of copper steel. This property helps to assure the long life and low maintenance cost of any equipment, subject to rusting, in which COR-TEN steel is used, whether to obtain greater durability or to reduce weight.

U·S·S COR-TEN steel is produced in all standard products—plates, shapes, bars, sheets, strip, special cold-formed sections and wire. Recommended particularly for application in light and intermediate thicknesses.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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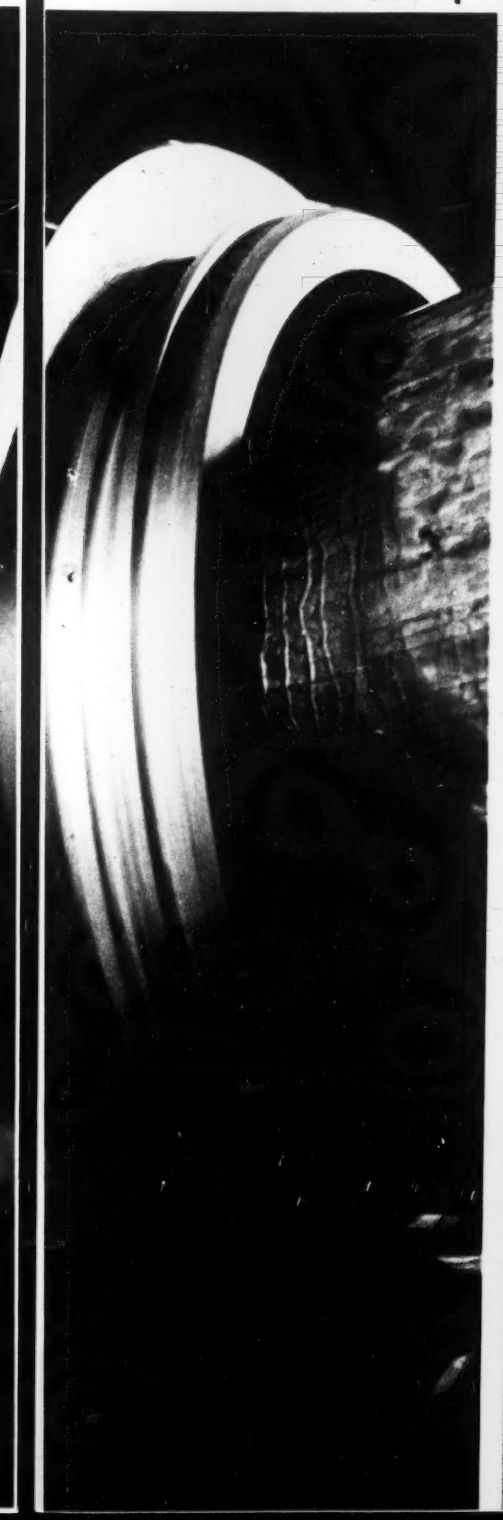
UNITED STATES STEEL

"I've been machining forgings

all my life"

says Charles E. Copeland U.S. Steel Machinist



WHEN a man spends a lifetime doing one skilled job to perfection, you're bound to have faith in him. Such a man is Charles Copeland, a U.S. Steel Machinist in the Forgings Division for 20 years.

He is the last man to work on your U S S Quality Forging. The painstaking hours of steel-making, forging, heat treating and inspection wind up in the lap of the machinist. As he makes that last careful cut, he has the reputation of the entire forge shop crew under his tool.

In his lifetime of work on every conceivable type of giant forging, Mr. Copeland has *never* made the dreaded misstep that sends a piece back to the furnace for a re-melt. In this respect, we believe he is completely typical of the small group of skilled craftsmen who make the famous U S S Quality Forgings.

We make our own steel, and have the finest equipment to forge it. But remember: forgings are made by *men*, and the best of them work for U.S. Steel.

Send for our free 32-page booklet on U S S Quality Forgings. For the booklet, or more information, address, United States Steel, 525 William Penn Place, Room 2819Z, Pittsburgh 30, Pa.

USS Quality FORGINGS

- heavy machinery parts — carbon, alloy, stainless
- electrical and water wheel shafts
- hammer bases and columns
- forged steel rolls and back-up roll sleeves

New facts for your file on

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

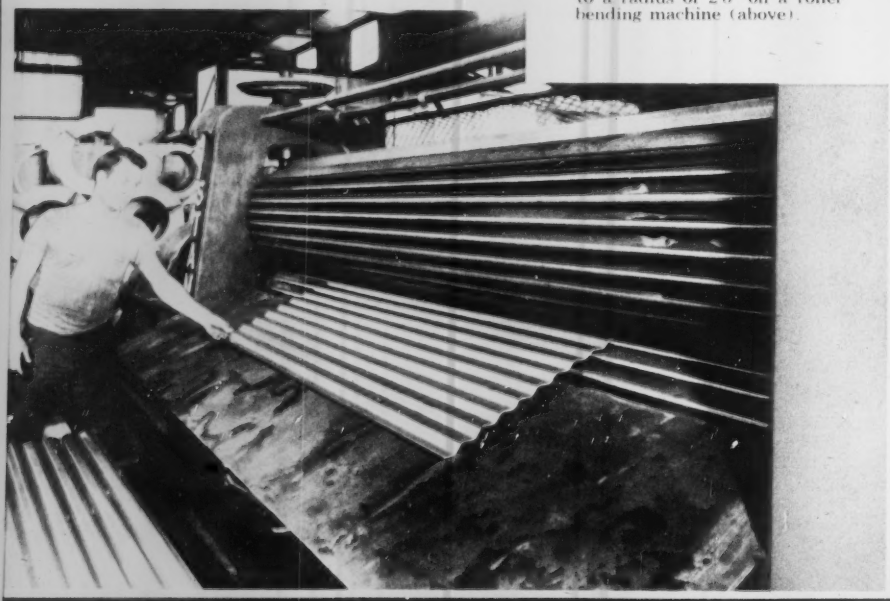
Corrugated sheets of Stainless Steel used for continuous conveyor cover

● Approximately 15,000 pounds of Stainless Steel went into a continuous conveyor cover fabricated by Elwin G. Smith & Company, Pittsburgh, Pa., for Consolidated Edison Company, New York.

The cover consists of 710 corrugated and curved sections each made from a sheet of Type 430 Stainless Steel .029" x 30" x 83". The sheets were corrugated on a standard type machine and then curved to a radius of 2'3" by a roller bending machine.

Officials of the Smith Company are well pleased with the results obtained from their initial use of Stainless Steel in this type of fabrication.

Stainless Steel sheets for continuous conveyor cover are corrugated (below) and then bent to a radius of 2'3" on a roller bending machine (above).



Take advantage of Stainless Steel in your designs and in your selling

Here are more applications typical of the thousands in which Stainless Steel has been used to improve design and add sales appeal. The wide range of valuable properties available in Stainless Steel makes it the ideal material for many, many jobs.

Put Stainless to work for you. It will pay its own way and give you a good return on your investment—especially when it is perfected, service-tested U·S·S Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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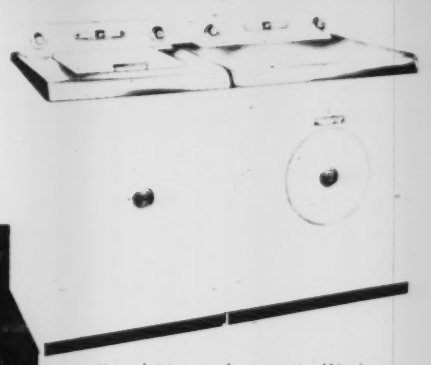
UNITED STATES STEEL

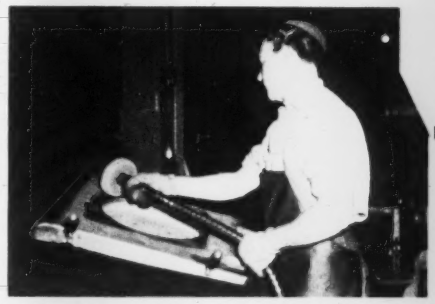
Speed Queen Automatic Washers and Dryers have tops of **Stainless Steel**



Speed Queen Automatic Washer Dryer Ensemble

● The attractiveness, corrosion resistance and long life of Stainless Steel made it the natural choice for the tops of automatic washers and dryers manufactured by Speed Queen Corporation, Ripon, Wis.

Type 430—a straight-chromium grade of Stainless Steel—is currently being used for this application. Sheets are sheared, punched, drawn, ground and polished into tops that add sales appeal and long life.

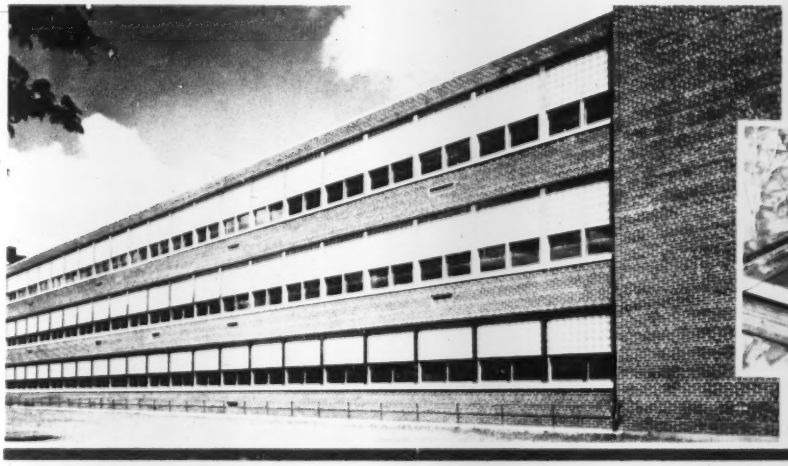


Polishing Stainless top for Speed Queen Washer

Stainless Steel Ribbon Windows highlight this Jamestown, N.D., school

● This grade school building in Jamestown, N. D., is an excellent example of the use of WILKE Stainless Steel Ribbon Windows manufactured by Wilke Metal Products, Inc., Schofield, Wisconsin.

These windows are fabricated from 18-gage Type 430 Stainless. They are brake formed, welded at the corners and then ground and polished to a soft, lustrous finish.



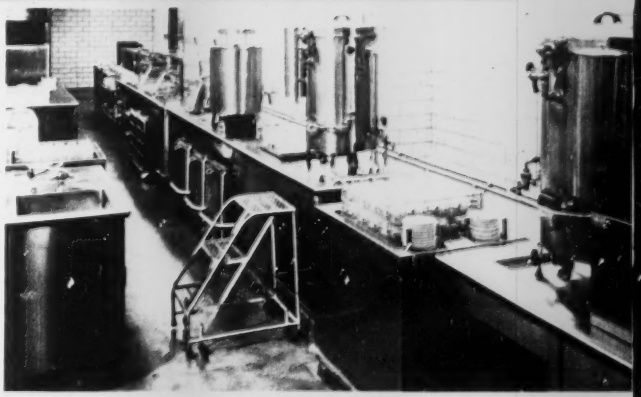
Ribbon windows in new grade school at Jamestown, N. D.

Welding corners of WILKE Stainless Steel Windows

Award-winning kitchen at Thompson Products literally glistens with **Stainless Steel**

● Winner of a Merit Award in Institutions Magazine's Seventh Annual Food Service Contest, this new cafeteria at Thompson Products, Inc., Euclid, Ohio, makes full use of the beauty and sanitary qualities of Stainless Steel.

The equipment was "custom-bilt" by Southern Equipment Company, St. Louis, Mo. An interesting feature of this installation is Southern's use of Stainless Steel for the fabrication of the cafeteria counter and various kitchen fixtures.



Cafeteria at Thompson Products, Inc., Euclid, O.

USS

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UNITED STATES STEEL

New facts for your file on U·S·S CARILLOY STEELS

One source for all your alloy steel plate, sheet, and strip

JUST SPECIFY U·S·S CARILLOY STEELS

All these requirements can be met with flat-rolled U·S·S CARILLOY steels

	PLATE	STRIP	SHEET
METHODS OF MANUFACTURE			
Electric Furnace	x	x	x
Open Hearth	x	x	x
SPECIAL QUALITIES			
Aircraft	x	x	x
Armor	x		
Bearing	x	x	x
Drawing	x	x	x
Flange and Firebox	x		
Metal Cutting Saw	x	x	x
Razor Blade	x	x	x
Other Special Qualities	x	x	x
TREATMENTS: INDIVIDUAL OR COMBINED			
Quenched and Tempered	x	x	x
Annealed	x	x	x
Spheroidize Annealed	x	x	x
Normalized	x	x	x
Stress Relieved	x		
CONDITIONS: INDIVIDUAL OR COMBINED			
Hot Rolled	x	x	x
Straight Lengths	x	x	x
Coiled		x	x
Flattened or Leveled	x	x	x
Gas or Special Cutting	x		
Pickled	x	x	x
Sand Blasted	x	x	x
Oiled	x	x	x
Formed Machined or Other Special Conditions	x	x	x
SPECIFICATIONS REQUIREMENTS: INDIVIDUAL OR COMBINED			
Grain Size	x	x	x
Macro-Etch	x		
Micro-Cleanliness	x	x	x
Restricted Chemical Analysis	x	x	x
Special Mechanical Tests	x		
Impacts	x	x	x
Tensile Tests	x	x	x
Bend Tests	x	x	x
AISI-Govt.-ASTM SAE	x	x	x
Special Specifications	x	x	x

• Note the accompanying list of qualities, treatments, conditions and specification requirements that can be furnished in U·S·S Carilloy plate, sheet and strip. This is the widest selection of flat-rolled Alloy Steel products you can secure from any one producer. Our unmatched mill flexibility and size range enable you to order anything from a razor blade strip to a plate for a battleship. This streamlines your purchasing, assures consistent quality and simplifies your manufacturing problems.

For complete information, contact our nearest sales office, or write direct to United States Steel Corporation, Room 2819-Z, 525 William Penn Place, Pittsburgh 30, Pa.

Free metallurgical assistance on any steel problem

Any time you have a metallurgical or fabricating problem, call in a United States Steel Service Metallurgist. He has an extensive knowledge of all types of Alloy Steels and can help cut costs by offering suggestions to assist your engineering and production people.

USS

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Nice work if you can do it...

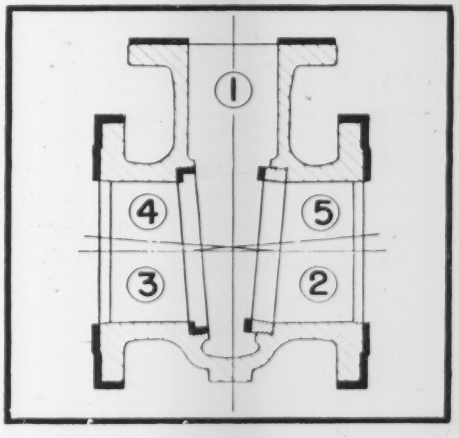
and you can...

with GISHOLT Turret Lathes...

Gisholt 3L Saddle Type Turret Lathe—one of five sizes for heavy-duty work of all kinds

Straight Machining... Angular Machining and Assembly...

all in one chucking!



Talk about time-cutting ideas, here's the versatility of a Gisholt 3L Saddle Type Turret Lathe paying off again.

All operations required to machine these gate valve bodies are done in a single chucking with a five-position indexing fixture. In addition to machining the bonnet and the two ends, the recesses for the two seat rings are bored and threaded at a five degree angle.

Then the seat rings are inserted—and tightly screwed in place with a driver mounted on the turret. The driving is done with a constant torque—adjustable to suit each job. The final operation is finish facing the seat ring after it is in place with the cross-feeding turret.

Gisholt Engineers have storehouses of ideas to help you increase your production. Ask one to call.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

NICE

"1600" Series Low Cost Precision Radial Bearings and "3000" Series Unground "Precision Type" Radials, Metal Shielded or Open, or with Composition Seals, Inch Sizes. Also "C" Series Precision Radial Bearings Metal Shielded or Open in established Light Duty Inch Standard Sizes. All Solid Inner and Outer Race Type with Retainer, as illustrated.

"500" Series Unground Radial and Thrust, Full Ball Type, Pressed Cone, Soft Outer Band, Inch Sizes.

"700" Series, similar to "500" Series except Solid Cone

"FR" Series Flat Race Ground Thrust with Solid Brass Ball Retainer, Inch Sizes

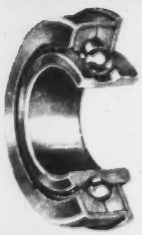
Ground Thrusts, Series "1000", "1100", "2600" and "2700", with Retainer, Inch and Metric Sizes.

PRECISION SEMI-PRECISION AND UNGROUND

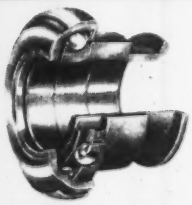
"600" Series and Automotive "Steering Knuckle" Self-contained Unground Thrusts, Full Ball Type, Soft Outer Band, Inch Sizes.

"400" Series Unground Deep Groove Radial, Full Ball Type, Soft Outer Band, Inch Sizes.

"1200" Series, Similar to "400" Series Except Double Row.



"Flanged" Series, Similar to "400" Series Except Outer Band Flanged.



"Clutch Release" Bearings, Angular Contact and Thrust Types, for Automobile, Truck, Bus, Tractor, Farm Machinery and Industrial Applications.

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"7500" Series and "7600" Series Precision Radial Bearings with Labyrinth Composition Seals, Solid Inner and Outer Race Type with Retainer, Inch Sizes.

ALSO BALL BEARING SHEAVES, WHEELS AND TROLLEY WHEELS

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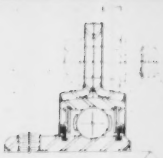

"F100" Series Flange Mounted Self-aligning Radial Bearings designed for easy application to Machine Frames. Solid Inner and Outer Race Type with Retainer, Labyrinth Composition Seals, Two Locking Set Screws. Popular Inch Shaft Sizes.

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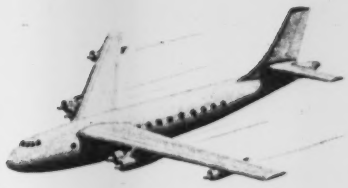

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ALLOY STEELS

MODERN STEELS for MODERN TRANSPORTATION

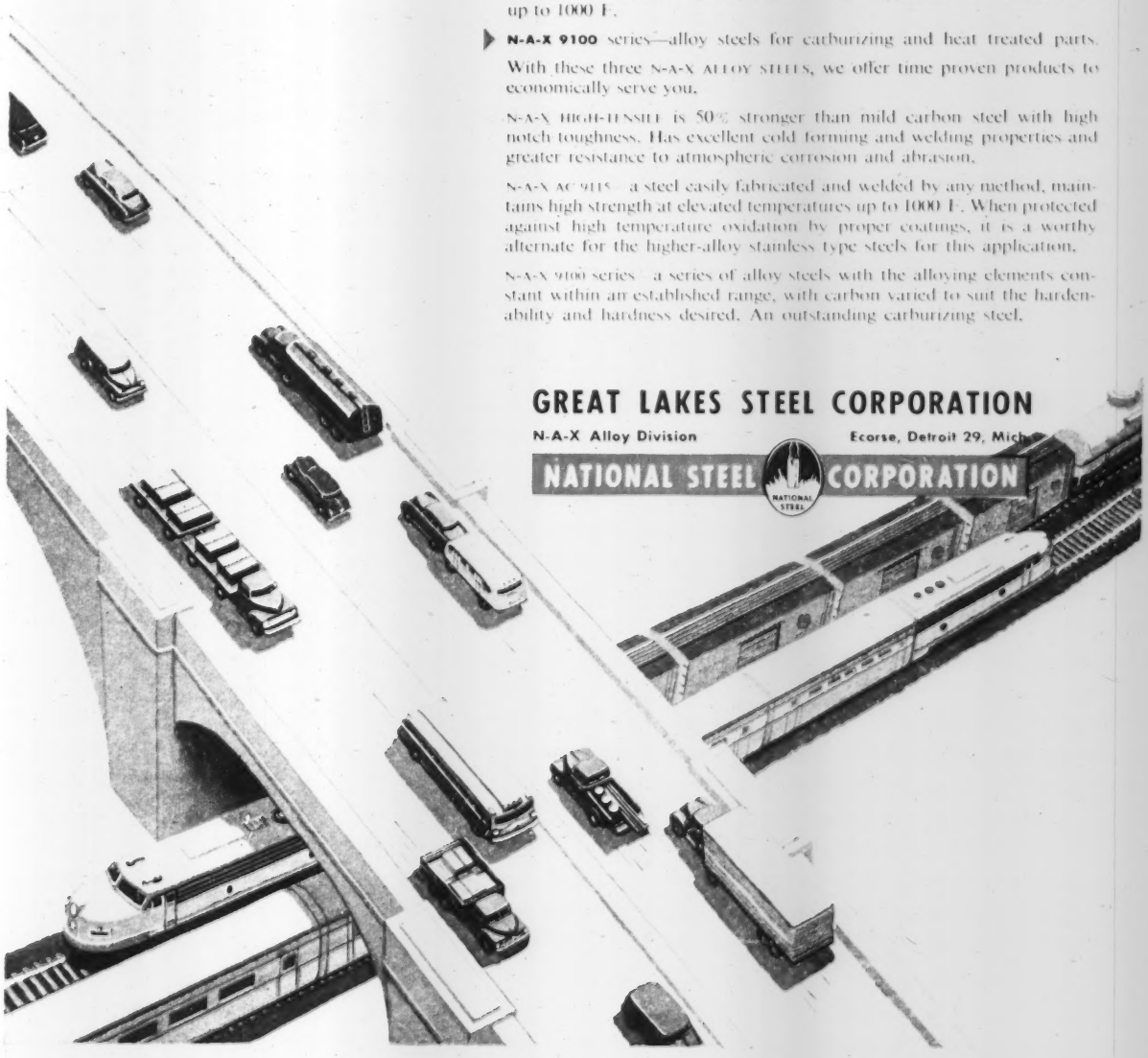
- **N-A-X HIGH-TENSILE** steel—a low-alloy high strength structural steel used to reduce weight and increase life of your product.
- **N-A-X AC 9115** steel—for gas turbines and similar products requiring strength of material when operated at higher than normal temperatures up to 1000 F.
- **N-A-X 9100** series—alloy steels for carburizing and heat treated parts.

With these three N-A-X ALLOY STEELS, we offer time proven products to economically serve you.

N-A-X HIGH-TENSILE is 50% stronger than mild carbon steel with high notch toughness. Has excellent cold forming and welding properties and greater resistance to atmospheric corrosion and abrasion.

N-A-X AC 9115—a steel easily fabricated and welded by any method, maintains high strength at elevated temperatures up to 1000 F. When protected against high temperature oxidation by proper coatings, it is a worthy alternate for the higher-alloy stainless type steels for this application.

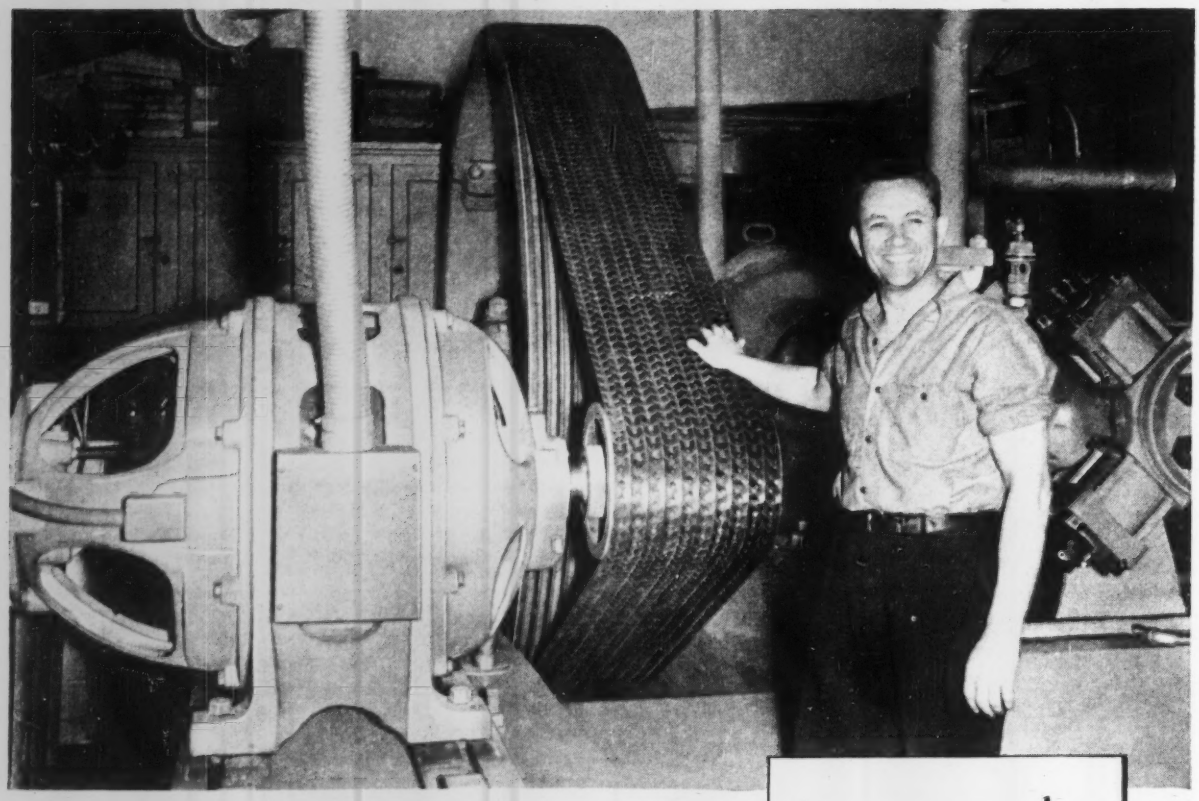
N-A-X 9100 series—a series of alloy steels with the alloying elements constant within an established range, with carbon varied to suit the hardenability and hardness desired. An outstanding carburizing steel.



GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division — Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION



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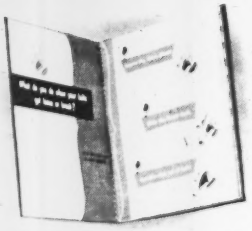
Actual in-plant records prove that Veelos v-belt can be installed *and operating* in up to 1/10th the time regularly needed to do the same job using endless v-belts.

Matched sets of Veelos are quickly made up in your own stockroom or at the machine by just coupling the correct lengths for the particular drive. Even outboard bearing drives are no problem. You *never* remove these outboard bearings, because Veelos is installed by simply coupling it around the shafts and running it onto the sheaves. And maintaining adequate stocks of Veelos is practically automatic. A quick check of the Veelos 100-foot reel will tell the inventory story.

For full vibrationless power delivery, for fast adjustability to keep sets matched, for ease of controlling inventory and for quick, simplified replacement — standardize on Veelos.



Have you seen this Veelos Facts Book?

Your Veelos v-belt distributor's salesman will be glad to give you a quick trip through this fact-packed, 36 page book. You'll find it well worth the few minutes it takes. Next time the salesman calls, ask him to show it to you.

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THE LINK
V-BELT

Write for a copy of the VEELOS DATA BOOK. It's fully illustrated and packed with useful engineering data. We'll be glad to send a copy along and you'll be glad to have it!

MANHEIM MANUFACTURING AND BELTING COMPANY
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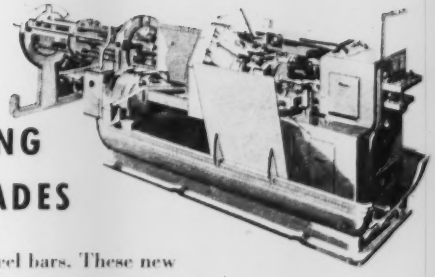
ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

NEW LEADED ALLOY STEEL BARS

MACHINE FASTER!



AVAILABLE IN .20 CARBON CARBURIZING AND .40 CARBON HEAT TREATING GRADES

Now you can get both Leaded 8620 and Leaded 4140 cold-finished steel bars. These new leaded alloy bars retain the properties of comparable non-leaded grades—but they machine one-third faster!

Over the past ten years, 8620 has proved to be the most popular alloy carburizing steel for most applications. Now, with lead, its metallurgical qualities are retained and machinability is greatly improved.

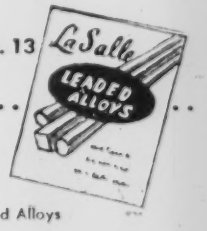
Since the middle thirties, 4140 has been a very popular oil quenching steel. Again, the addition of lead does not change the heat treating practice, but does improve machinability.

The heat-treating characteristics, hardenability, and mechanical properties of these bars are not appreciably affected by the addition of lead. The sole purpose of adding lead is to improve the steel's machinability. Order a trial lot and see what these steels can do on your machines.

La Salle STEEL CO.

Manufacturers of the Most Complete Line of Cold-Finished Carbon and Alloy Steel Bars in America

***Send for* Helpful Data Bulletin No. 13 on Leaded Alloys**



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1414 150th Street
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Please send me your new Bulletin on Leaded Alloys

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SPEED *Prevents* WASTE

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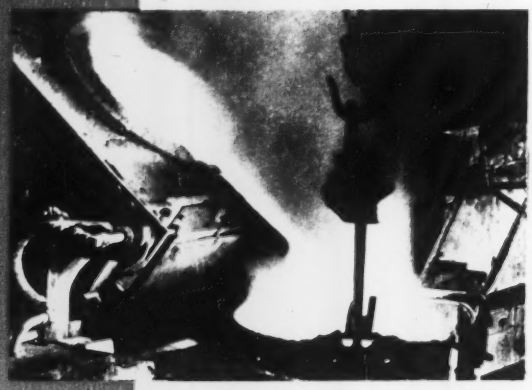
Ajax-Northrup Induction Furnaces melt so fast there's no time for "burning up" chromium, molybdenum, master alloys, and other easily oxidized materials.

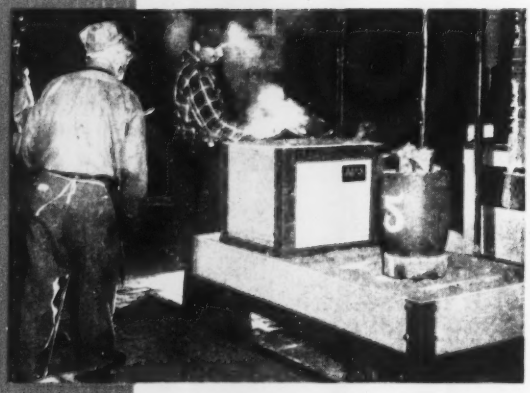
One foundry, melting stainless steel, recovers 99% of the chromium charged... saves $60,000 a year in reduced losses of this single element.

A typical non-ferrous foundry reduced melting costs by over $33.00 a ton!

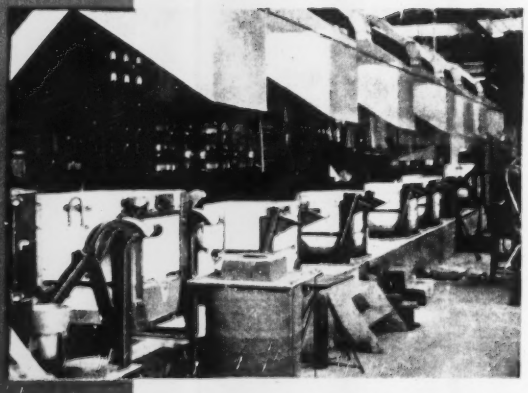
If you've got a tough melting problem where speed, accurate control, and low losses of expensive metals are important, we'd like to show you what induction melting can do for you. Just write or call us.



STEEL MELTING



NON-FERROUS MELTING



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INDUCTION HEATING AND MELTING

Since 1916

CALENDAR
OF MEETINGS

December 29, American Association for the Advancement of Science: Panel discussion on visual performance and testing procedures. Bradford hotel, Boston. Panel chairman: Dr. N. Franklin Stump, Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.

January 5-7, American Road Builders' Association: Annual meeting. Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: World Center Bldg., Washington 6. Secretary: Lt. Gen. Eugene Reybold.

January 11-13, Truck-Trailer Manufacturers Association Inc.: Annual meeting. Boca Raton hotel and club, Boca Raton, Fla. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

January 11-15, Society of Automotive Engineers Inc.: Annual meeting and engineering display. Hotels Sheraton-Cadillac and Statler, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

January 12-14, National Constructors Association: Annual meeting. Hotel Commodore, New York. Association address: 50 E. 41st St., New York. Secretary: C. B. Bronson.

January 13, American Boiler Manufacturers Association & Affiliated Industries: Winter meeting. Hotel Cleveland, Cleveland. Association address: 1571 W. 117th St., Cleveland 7. Secretary: A. C. Baker.

January 14-16, National Tool & Die Manufacturers Association: Board of trustees and committee meeting. Hotel di Lido, Miami Beach, Fla. Association address: 907 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

January 17-19, Institute of Scrap Iron & Steel Inc.: Annual convention and exhibit. Hotel Statler, Washington. Institute address: 1729 H St. NW., Washington 6. Executive vice president: Edwin C. Barringer.

January 18-22, American Institute of Electrical Engineers: Winter general meeting. Statler hotel, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

January 19-21, Caster & Floor Truck Manufacturers Association: Winter meeting. Hotel New Weston, New York. Association address: 27 E. Monroe, Chicago 3. Executive secretary: H. P. Dolan.

January 20, American Society of Body Engineers: Annual meeting, Detroit. Society address: 100 Farnsworth Ave., Detroit 2. Secretary: Edmund Wachnicki.

January 21-22, National Industrial Conference Board Inc.: General session for all associates. Hotel Astor, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

January 22, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society address: 1800 Union Commerce Bldg., Cleveland 14. Managing director: Lowell D. Ryan.

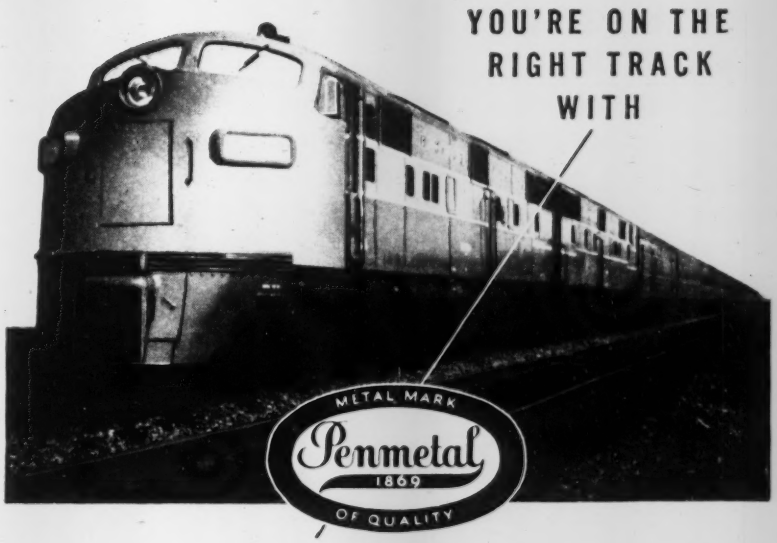
January 25-26, Industrial Furnace Manufacturers Association Inc.: Annual meeting. Warwick hotel, Philadelphia. Association address: 412 Fifth St. NW., Washington. Secretary: T. F. Sheckels.

January 25-28, Plant Maintenance & Engineering Conference and Show: Hotel Conrad Hilton and International Amphitheatre, Chicago. Information: Clap & Poliak Inc., 341 Madison Ave., New York 17.

January 26, Cutting Tool Manufacturers Association: Annual meeting. Lochmoor Club, Detroit. Association address: 416 Penobscot Bldg., Detroit 26. Executive secretary: Martin J. Ewald.

January 26, Mining & Metallurgical Society of America: Annual meeting. Mining Club, New York. Society address: 11 Broadway, New York 4. Secretary: Lt. Col. Donald M. Liddell.

January 29, Cleveland Chamber of Commerce: Northern Ohio personnel and executive conference. Hotel Carter, Cleveland. Information: William G. Donaldson, Cleveland Chamber of Commerce, Union Commerce Bldg., Cleveland.



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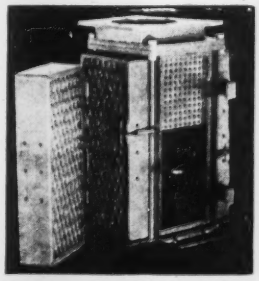
Cheapest "Diamonds" You Can Buy



Farr Filter Adapter Assembly used extensively on freight and passenger locomotives.

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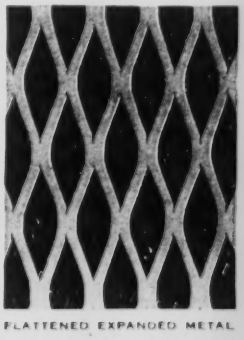

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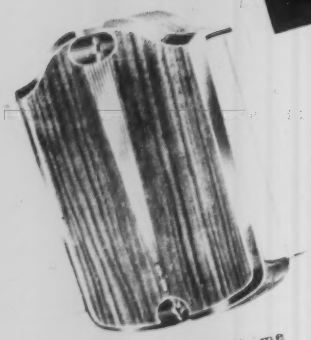
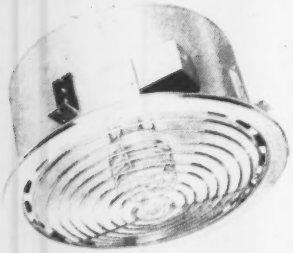
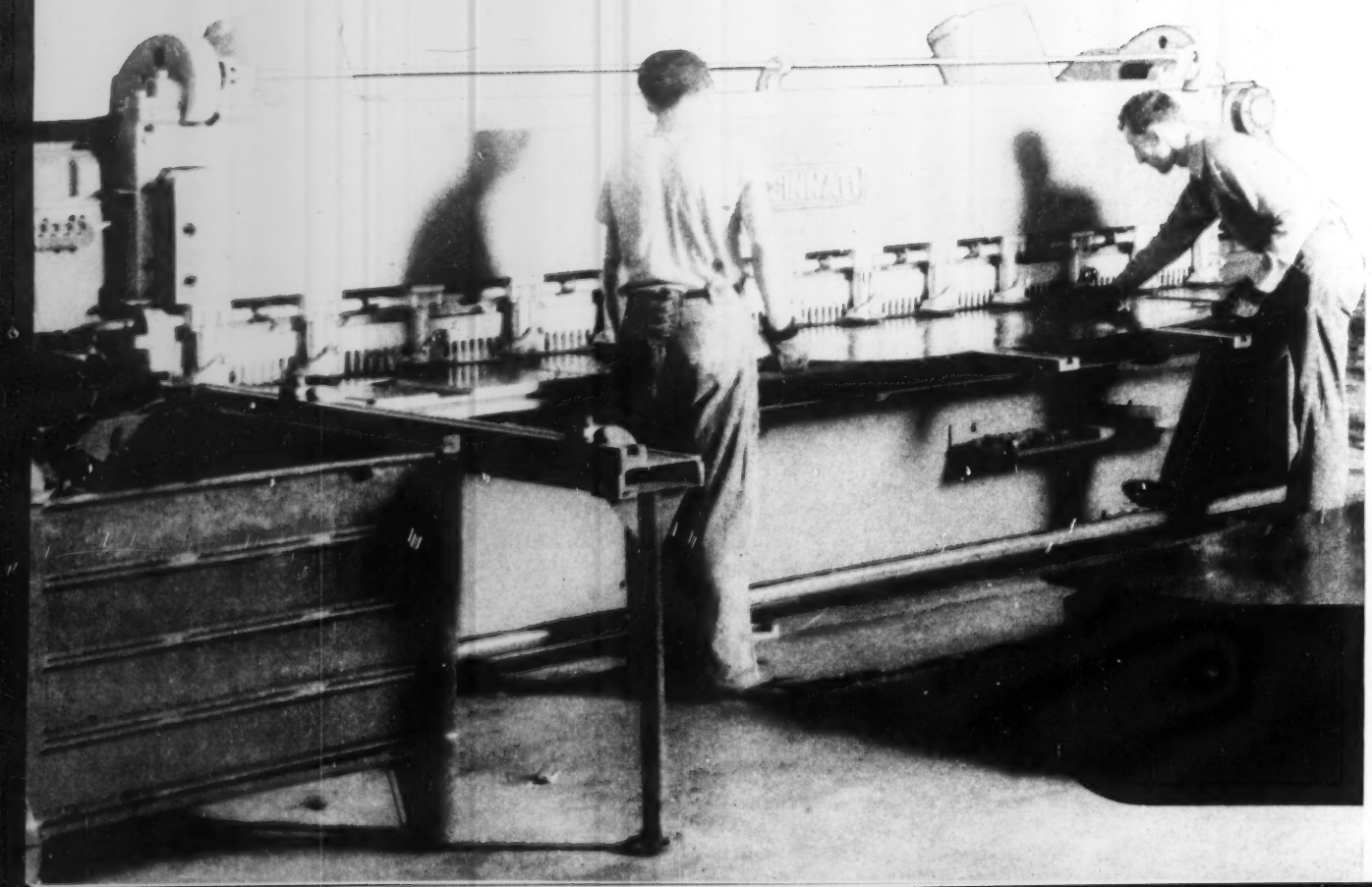


Colonial Chime



Electric Ceiling Heater



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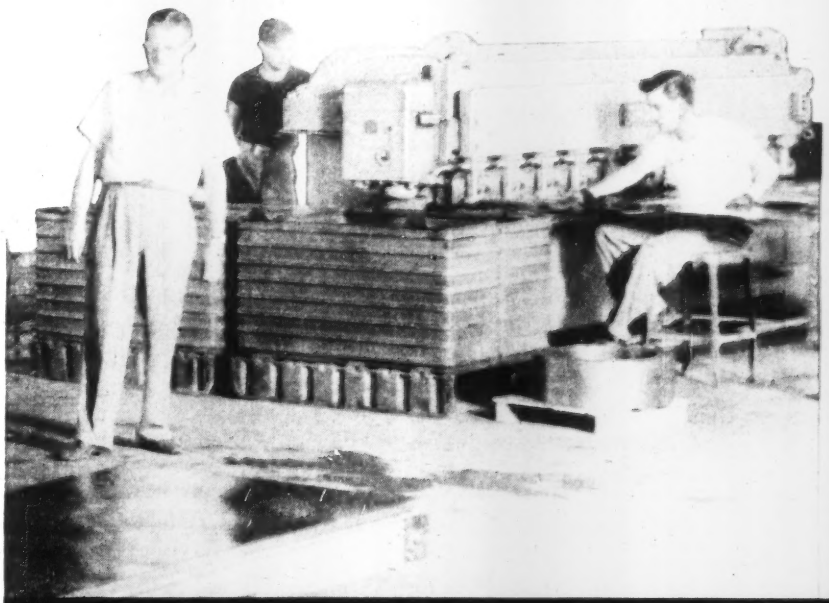
One hundred and seventy-five tons of light sheets are sheared a month. Press operations are speeded and spoilage is at a minimum. The flexibility of the shearing operations take care of new products or changes in design with no tooling or special costs. Investigate these accurate Shears.

Write for catalog S-6.



Photos courtesy Nutone, Incorporated, Madison and Red Bank Roads, Cincinnati 27, Ohio

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

You know he's always on the job

Come hell or high water, there are some people who simply won't be denied the privilege of doing their duty. It's just a matter of basic character, disciplined by daily diligence . . . and, as much as anything else, a pride in maintaining a record that has been so painstakingly built.

This is the kind of duty that Bristol Brass men understand so well. They, too, have a name for "always being on the job" . . . and they won't stand for the smallest nick in that name . . . if determination, brains and resourcefulness can help it. *And they have plenty of all three.* Try Bristol Brass service on your own sheet, rod and wire needs. You may encounter *two* new experiences . . . in quality, as well as in service.

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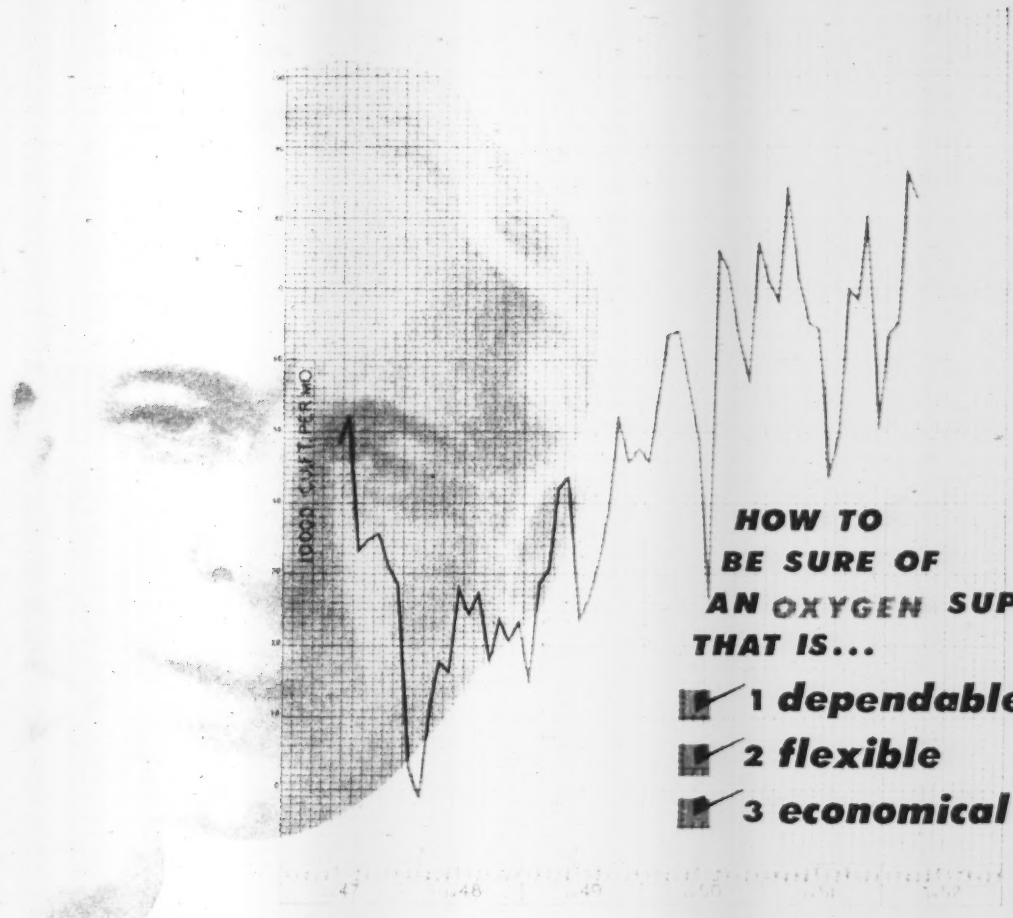
The BRISTOL BRASS CORPORATION, makers of Brass since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

"Bristol-Fashion" means **Brass at its Best**

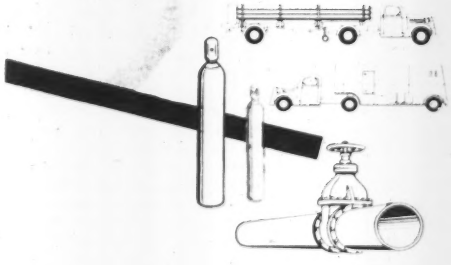


HOW TO BE SURE OF AN OXYGEN SUPPLY THAT IS...

- 1 dependable
- 2 flexible
- 3 economical

1 If a complete or partial failure in your high-purity oxygen supply would hurt your production — you need a *dependable* supply. Airco can meet your demands for high-purity oxygen when and where you need it. Our vast network of plants in industrial areas is backed by adequate storage facilities, and a fleet of oxygen delivery trucks.

2 If your oxygen consumption varies like the typical example shown — you certainly need a *flexible* supply. You can meet peak requirements without the cost of extensive storage facilities — yet pay only for the exact amount you need when the demand lightens, without the many costs of idle capacity — by buying Airco oxygen.



3 No matter how much oxygen you use — you want an *economical* supply. Airco oxygen of a uniform high-purity is produced in volume for a nation-wide market — to give you, the individual user, low cost.

Call or write your nearest Airco office for help in planning the most economical oxygen supply for your needs. Airco specialists can help you *use* oxygen most efficiently, too.

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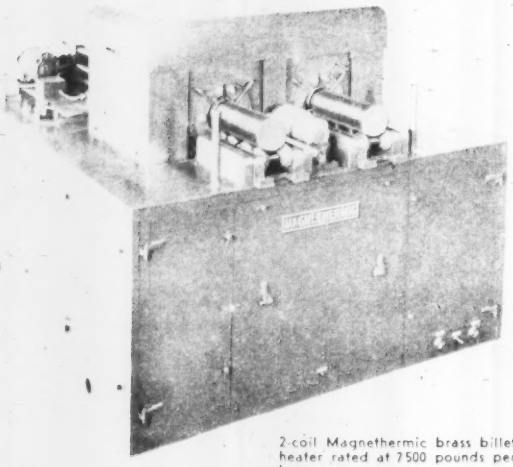
AN AIR REDUCTION PRODUCT

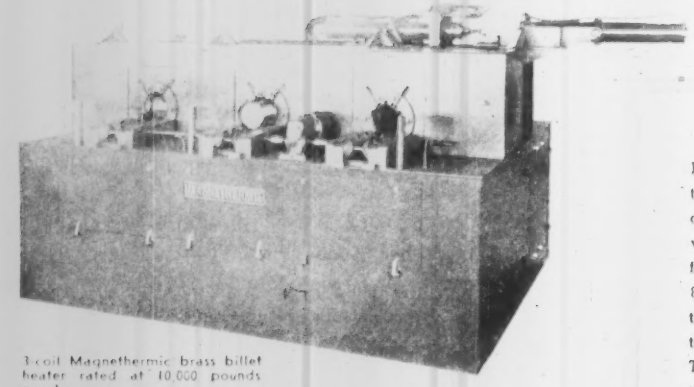
Induction Heaters for Brass and Copper Billets

REDUCE OPERATING COSTS

Magnethermic 60-cycle brass and copper billet heaters, now in operation, prove that they do reduce operating costs. Billets are heated in two or three minutes rather than hours. Temperature control is extremely accurate . . .each billet is discharged at exactly the same temperature. No warm-up time is required. On initial start ups, press the button, and in two or three minutes, heated billets are ready for further processing. No need to schedule billets ahead of time. Not more than three billets are in process at any one time.



2-coil Magnethermic brass billet heater rated at 7500 pounds per hour.



3-coil Magnethermic brass billet heater rated at 10,000 pounds per hour.

MAINTENANCE

Furnace damage is caused by heat. In a typical Magnethermic heater, the heating chamber is a tube 8" in diameter, 24" long, and water cooled for long life. In a conventional furnace, the heating chamber may be 40 ft. long, 8 ft. wide and 3 ft. high. It stands to reason that the latter will require many times the maintenance that the induction coil requires. Then too, no need to shut down when relining the coil. Operate on the other coils, or put in a spare coil. Coils can be changed in ten minutes and relined in an hour or two.

ALL SIZES

Magnethermic makes a single, two, or three-coil heater for any production requirement needed. All heaters are shipped completely assembled. Installation cost is at a minimum. Working conditions are ideal and floor space is negligible.

Heaters will operate equally well on extrusion billets, piercer billets, or wire bars. If you have a heating problem, let one of our engineers discuss it with you. A letter or phone call will receive prompt attention.

60-CYCLE INDUCTION HEATING

MAGNETHERMIC®
corporation
3990 SIMON ROAD . YOUNGSTOWN 7, OHIO

men who use REPUBLIC UPSON BOLTS AND NUTS appreciate these advantages . . .

tough shanks withstand tension and vibration
strong threads take tough wrenching
clean, accurate, well-mated threads speed up assembly

● More than 20,000 different types, sizes and shapes of top-quality Republic Upson Bolts and Nuts are at your service. To make any product lastingly tight, to save time in assembly . . . depend on Republic Upson for all your fastening needs.

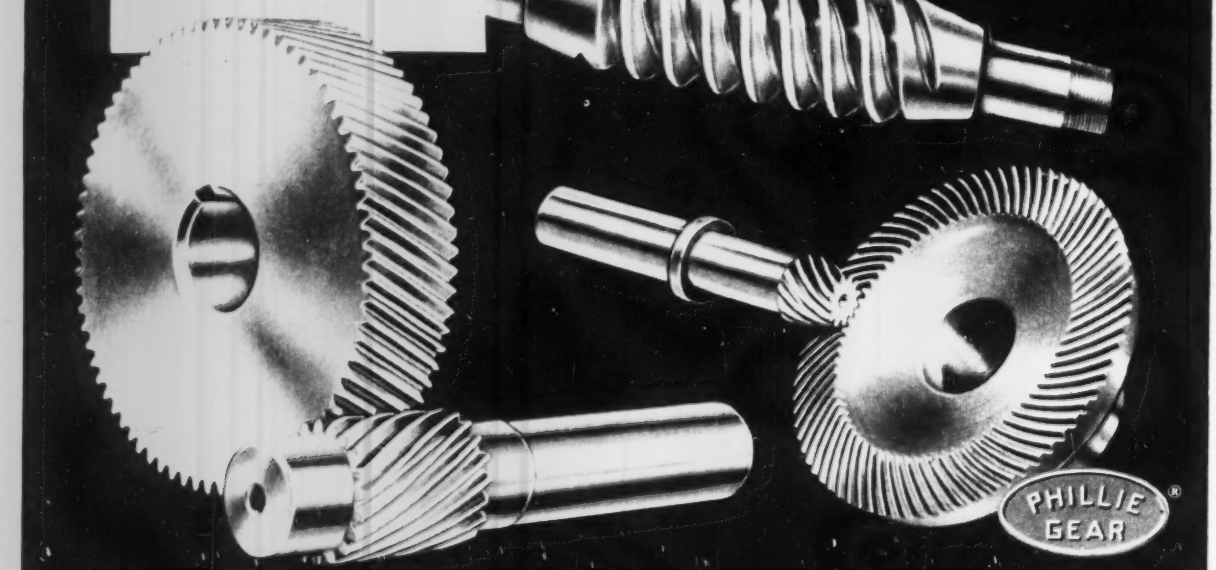
REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
CLEVELAND 13, OHIO • GADSDEN, ALABAMA
Export Department: Chrysler Building, New York 17, N.Y.

GEARS

any size, any quantity

Spur	Splines
Helical	Coniflex Bevel
Spur Internal	Spiral Bevel
Helical Internal	Zerol
Rack	Hypoid
Herringbone	Intermittent
Worm	Sprockets
Non-Metallic	



Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Your Honeywell instrument service starts here . . .

THOROUGH TRAINING is the foundation of Honeywell instrument service. In classrooms and in the Honeywell factories, hand-picked men first are schooled in both the theory and practical art of keeping good instruments in the best condition.

Then they serve an apprenticeship in field work . . . learning still more through first-hand experience. The Honeywell service man who comes to your plant is a full-fledged specialist, well equipped to render the service you need . . . and that your Honeywell instruments deserve.

These men are part of the world's largest instrument service organization. They're at your call in more than 110 Honeywell offices, located near every major production center from coast to coast.

When trouble occurs, just pick up your phone and one of them will get to your plant promptly . . . within a few hours. But to prevent troubles before they start, investigate Periodic Instrument Service . . . an economical plan that assures your instruments of regular check-ups by a capable service man.

Honeywell's service school training is also available, at no charge, to employees of customers.

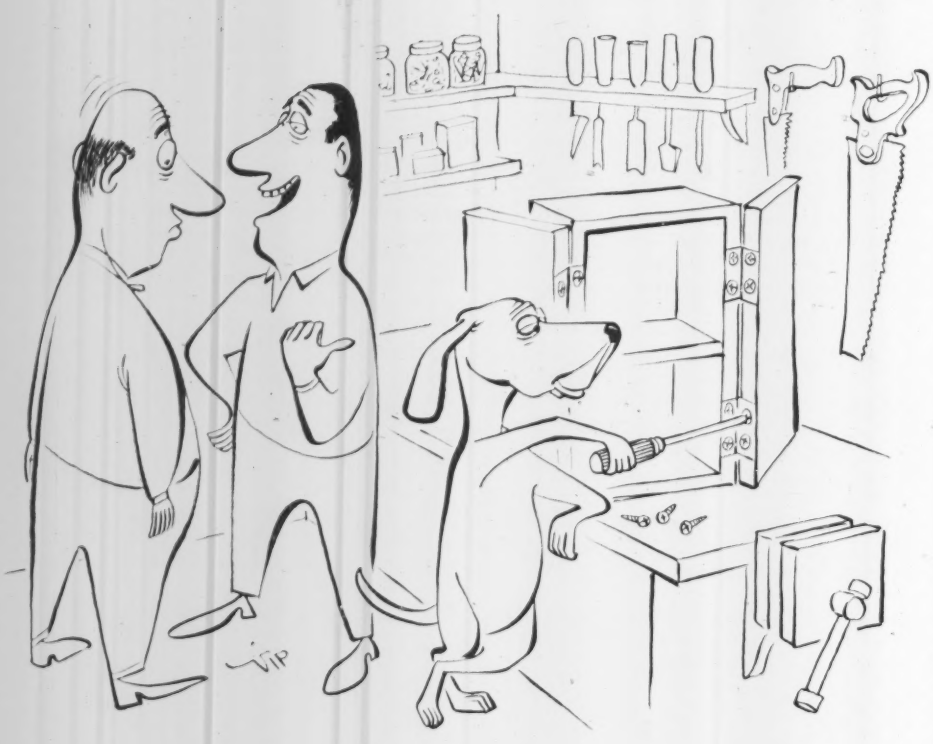
Your nearest Honeywell office will gladly give you full details about Honeywell instruments, controls . . . and service.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4462 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls

What's Screwy?

by Phillips



"Oh, he's not so smart. It's just that those Phillips Screws are so easy to drive."

PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

EASE of driving is only *one* big advantage. Phillips Screws save time, work and money. They also add structural strength, set up tighter, resist the loosening effect of vibration. And they eliminate driver skids, damaged parts and split screw heads.

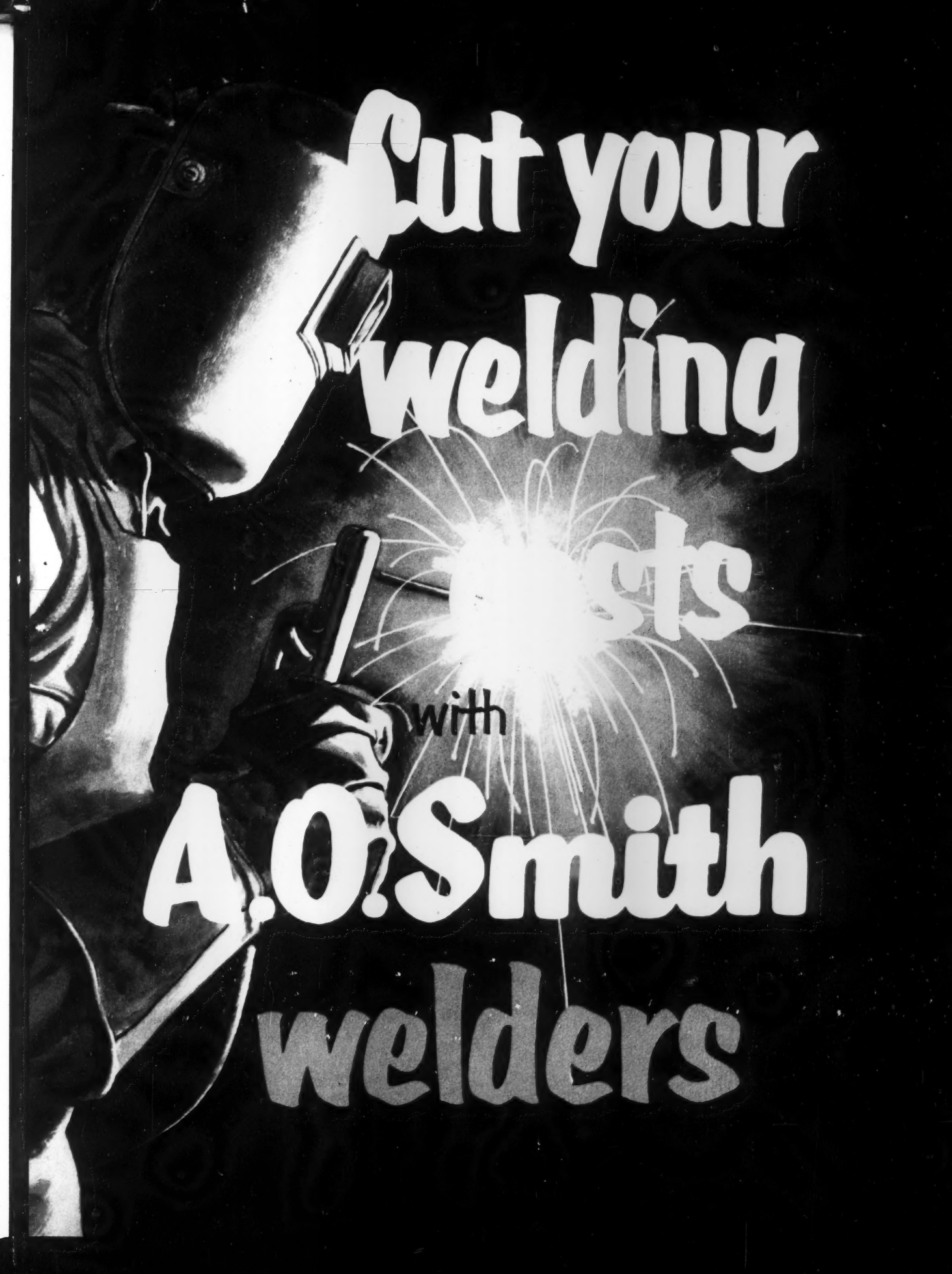
The identifying X on the cross-recessed-head identifies the x-tra quality of Phillips Screws instantly. Be sure to state "Phillips" on the specifications.

PHILLIPS *Cross-Recessed-Head* SCREWS

X *marks the spot . . . the mark of extra quality*

AMERICAN SCREW COMPANY • ATLANTIC SCREW WORKS, INC. • THE BLAKE & JOHNSON CO.
CENTRAL SCREW COMPANY • CONTINENTAL SCREW COMPANY • THE EAGLE LOCK COMPANY
ELCO TOOL AND SCREW CORPORATION • GREAT LAKES SCREW CORPORATION • THE H. M. HARPER CO.
THE LAMSON & SESSIONS COMPANY • NATIONAL LOCK COMPANY
THE NATIONAL SCREW & MANUFACTURING CO. • PARKER-KALON CORPORATION
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF DIV. OF ILLINOIS TOOL WORKS • THE SOUTHINGTON HDWE. MFG. COMPANY
STERLING BOLT COMPANY • STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.

TODAY'S . . . AND THE FUTURE'S . . . FINEST FASTENER


Cut your welding
sts
with
A.O.Smith
welders

...and get all the

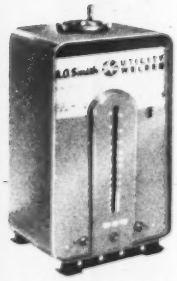
A. C. CHAMPION

heavy duty welder

Designed and long proved the most dependable power source for continuous operation on the most demanding welding assignments at full rated output.

The CHAMPION has enough copper, plus downdraft ventilation, to assure no more than a 55° C. temperature rise when operating at full rated output. This means almost twice the operating life of any comparable heavy-duty welder!

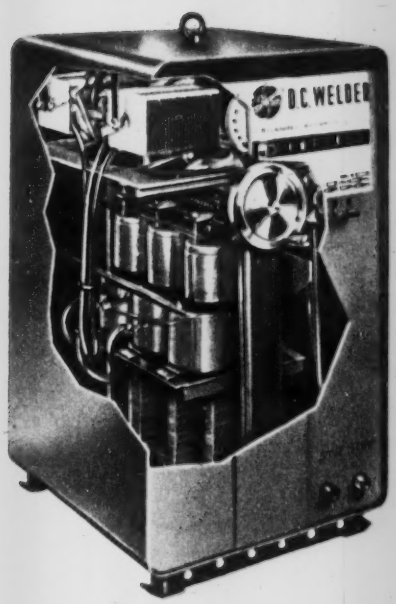
75 open circuit volts for high-speed welding with a faster and smoother arc! You can "drag the arc" on rapid work and weld low-hydrogen electrodes without "pop-outs." All-weather case makes it as useful outside as in the shop. Available in 300-, 400- and 500-amp models.



The **A. C. UTILITY** for farms, garages, machine shops with dual welding range 25-90 amps., 35-180 amps.

extra benefits

which A. O. Smith design and engineering provide!

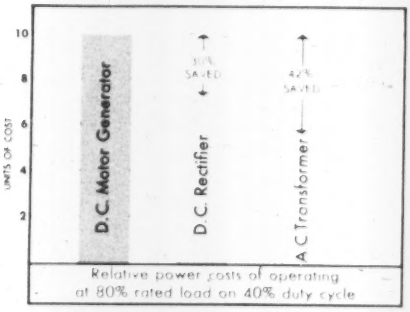


D. C.
RECTIFIER
heavy duty welder

Here is a complete line of N.E.M.A.-rated welding power sources that operate without a single, heavy, rotating part! No motor (other than ventilating fan) and no generator . . . nothing to wear, no commutators to corrode or turn down, no bearings or brushes to replace! Yet they provide a better welding current for all types of work, and operate with unmatched efficiency!

SAVE POWER

Power costs of operating 400-amp. welders are charted below, providing an opportunity to compare motor-generator, rectifier, and AC transformer demands on 40% duty cycle.



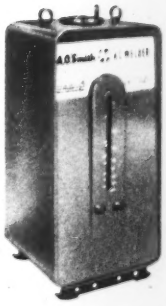
The savings in power effected by transformer type machines over motor generators result from the improved efficiency under load of the A. C. transformer (85% to 88%) and the D. C. Rectifier (69% to 72%) over the D. C. Motor Generator (45% to 50%), plus the ability of transformer and rectifier to deliver full welding current instantly, when demanded, without requiring large idle-time power to keep rotating parts in motion. The savings are real. In fact, many manufacturers have found that a new transformer will practically pay for itself in a year! Ask your A. O. Smith distributor or representative to show you how, at your next opportunity.

SAVE OTHER COSTS

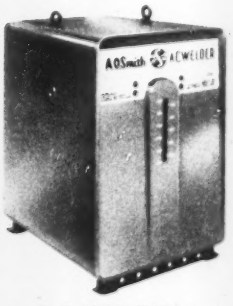
You save more than power costs when M.G. sets are replaced by A. O. Smith welding machines. Rectifier and transformer welding current inherently has less arc blow, and that means higher quality welds, faster welding speeds and less spatter. It also means greater overall operator efficiency, which assures better weldments, less weld repair and gives the operator greater pride in his work. The result: more money saved and production improved!

Because there are no moving parts, A. O. Smith welders require practically no maintenance. Quiet in operation, they are built to stand up under gruelling production schedules.

Modern successor to the cumbersome, troublesome, lumbering motor-generator set! This welding power source provides smoother arc performance, more dependable amperage at all times, instant striking arcs, and uses power only when welding! It's the only rectifier-type welder designed with high-velocity down-draft ventilation, which draws cool air in over the rectifier stacks before blasting it through the machine. Even when short-circuited at full rated amperage setting, the rectifier stacks remain below critical temperature! Stepless amperage control, effortless and accurate over the full range, assures exactly the desired setting for any job. The three-phase transformer coils are precision wound, of heavy copper, for long service life. Available in 200-, 300- and 400-amp. models.



The **A. C. CHALLENGER** all-purpose welder 200-, 300- and 400-amp. models



The **A. C. AUTO-MAN** for automatic or manual use 650-amp. model; up to 4-unit multiples available

There are A. O. Smith welding power sources for every welding need, built to the highest standards in the industry and of advanced design that makes them more desirable than any other make. Job proved in the shops of the world's largest user of welding as a production tool!

It will pay you to replace M.G. sets with A. O. Smith welders. May we suggest that you write us or contact your local A. O. Smith distributor for full particulars.

A.O.Smith
CORPORATION

WELDING PRODUCTS DIVISION, Milwaukee 1, Wisconsin

INTERNATIONAL DIVISION: MILWAUKEE 1, WISCONSIN

Highest Quality Welding Electrodes

Mild Steel	AWS Class	E6010	E6011	E6012	E6012	E6013	E6013	E6020
	A. O. Smith	SW10	SW14	SW11	SW17	SW15	SW16	SW35

High Tensile	AWS Class	E7010	E7010	E7020	E8013	E9010	E9013	E10013	E10020
	A. O. Smith	SW75	SW80	SW76	SW86	SW95	SW87	SW88	SW101

Low Hydrogen	AWS Class	E6016	E6016	E7016	E8016	E9016	E9016	E10016	E12015	E12016
	A. O. Smith	SW64	SW65	SW84	SW81	SW90	SW89	SW100	SW120	SW103

Stainless	AISI Class	302	305	410	430	308	308	309	309	310	310	310	310	310	316	317	318	347	347
	A. O. Smith	SW151	SW152	SW153	SW154	SW162	SW362	SW166	SW167	SW159	SW359	SW169	SW168	SW368	SW160	SW161	SW158	SW157	SW357

Complete line of welding accessories

All the essentials to put welding to work are available through A. O. Smith. Quality welding cable, connectors, splicers, ground clamps, tongs, and holders; helmets, shields, gloves, and protective clothing; electrode storage ovens, machines and electrodes ... everything required for welding can be had from one responsible source. Take advantage of this for all your welding needs.

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

INTERNATIONAL DIVISION: MILWAUKEE 1, WISCONSIN

Made by welders . . . for welders

From these mountains —1,000,000 JOBS

All winter long, snow sifts down on the spruce-covered mountains of Canada. A blanket weighing billions of tons. In spring, the rains come . . . and through the summer. Rivulets merge into streams; the streams become raging torrents. This is one of Canada's greatest natural resources — abundant water power.

It is the answer to inexpensive electricity . . . and *low-cost aluminum*. For no other standard industrial process requires so much electricity per unit of output. Almost a fourth of all hydroelectric power generated in the United States is consumed by the aluminum industry. You could light your house for a lifetime with the electricity it takes to make one ton of aluminum.

These mountains, this vast natural watershed, make it possible for our associate company — the Aluminum Company of Canada ("Alcan") — to produce aluminum economically. This aluminum, in turn, helps keep over a million American metal-workers busy. And it adds no power load to the vast U. S. demands — a vital consideration, particularly in drought years.

Those are the economics. The payrolls, the busy foundries and fabricating plants, the thousands of aluminum products for U. S. defense, industry, farm, and home — these are the tangibles that make Canadian aluminum such an important integral part of the North American industrial pattern.

ALUMINUM IMPORT
CORPORATION

Distributing company of the **ALUMINIUM LIMITED** *group, in the Western Hemisphere*

Offices and agents in 40 cities — *Cable address: ALIMPORT*

630 Fifth Avenue, New York 20 · 20 North Wacker Drive, Chicago 6 · 505 Terminal Tower, Cleveland 13
510 West Sixth St., Los Angeles 14 · Av. Ing. Luis A. Huergo 1279, Buenos Aires · Rua Da Quitanda 96, Sao Paulo

Meet all electrical "specs" with Youngstown Buckeye Conduit!

CONTRACTOR TELLS WHY HE'S FOR BUCKEYE: "When wiring homes, I refuse to take short cuts. That's why I use Youngstown Buckeye rigid steel conduit. That's the conduit approved for all types of building construction and occupancy—for tomorrow's demands as well as today's. Buckeye gives wiring complete protection. Home owners like to know that."

LISTEN TO THIS CONSULTING ELECTRICAL ENGINEER: "Only full weight standard threaded rigid steel conduit is approved by the Code as moisture, dust and explosion proof for use in hazardous locations. That's why I always specify Youngstown Buckeye conduit. In addition, I find that the strength and permanence of Buckeye conduit is appreciated by builders."

Youngstown manufactures full weight standard threaded rigid steel conduit from start to finish. This assures better steel and consistency of quality in manufacture. Only top grade steel gives complete long term protection. When you buy or specify Youngstown Buckeye conduit, you know you're meeting all construction requirements.

Shipments of Buckeye rigid steel conduit are now being made from our conduit mills at Indiana Harbor and Youngstown.

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

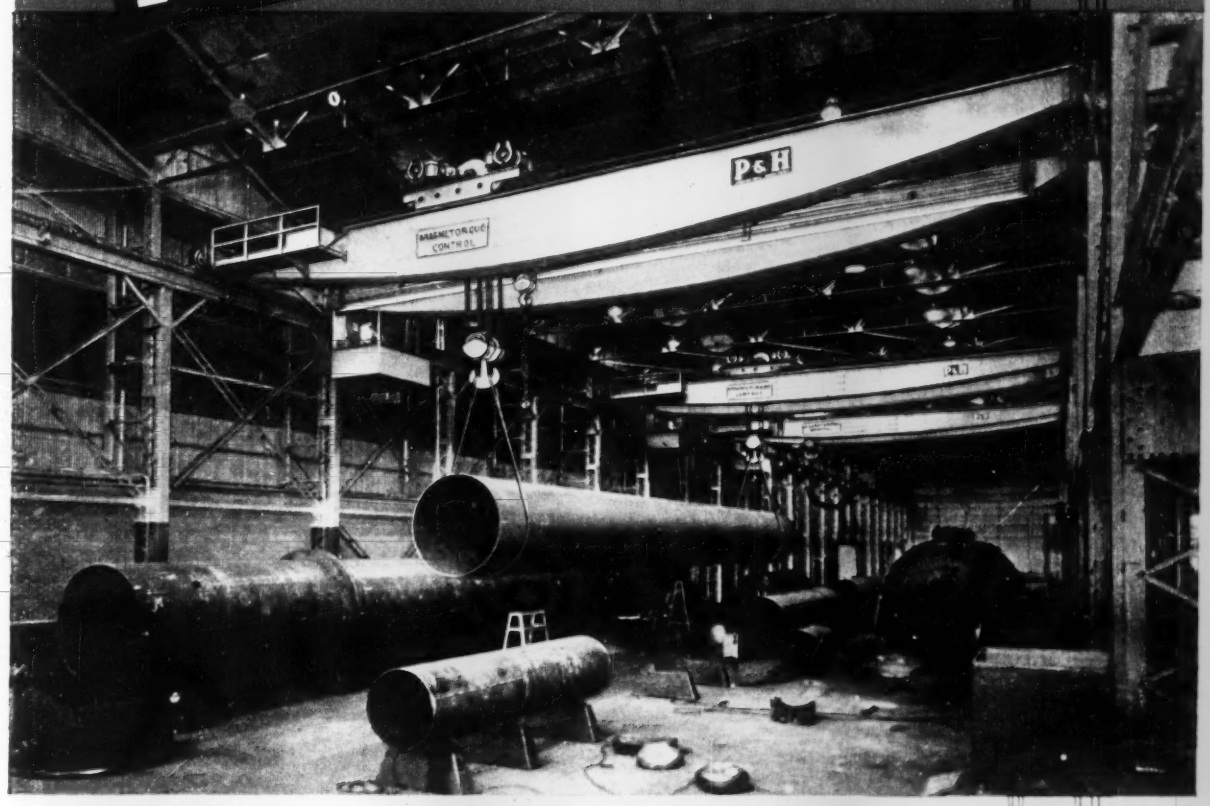
General Offices — Youngstown 1, Ohio

Manufacturers of Carbon, Alloy and Yoloy Steel

Export Office-500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS · ELECTROLYTIC TIN PLATE · COKE TIN PLATE · WIRE · PIPE AND TUBULAR PRODUCTS · CONDUIT · RODS · SHEETS · PLATES · BARS · RAILROAD TRACK SPIKES.

P&H OVERHEAD CRANES



P&H *Magnetorque*® (AC crane control)

. . . Outstandingly Successful in more than 900 Installations

Right from the start, P&H Magnetorque was hailed as one of the most important crane developments in 25 years. And so it has proved to be! Since it was introduced in 1947, more than 900 Magnetorque installations have been put on P&H Cranes. *And every single one is successful!*

Magnetorque AC Crane Control, developed and perfected by P&H, gives you the finest control ever devised with the economy and convenience of AC power. It gives you better performance — *proved performance!* And far lower maintenance costs. Remember, P&H electrical equipment is *designed and built* for crane service — *not adapted for it!*

If plant expansion or modernization is in your program, review your crane problems with P&H at the earliest planning stages.

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

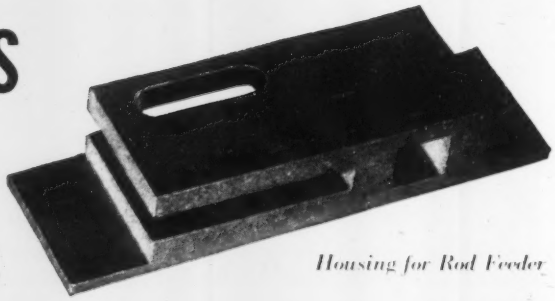
Just off the press — a new 24 page bulletin on Industrial Cranes. Ask for Bulletin CB-3

the P&H *Line*

These Intricate Parts are

PRECISION-CAST

ECONOMICALLY
TO CLOSE DIMENSIONS



Housing for Rod Feeder

Internal Operating Lever

These two parts—vital to a starting-rod feeder for a hand-scarfing blowpipe—are produced in quantity by HAYNES precision-investment casting. Both parts are too intricate in shape for accurate production by conventional casting methods. And since they are made from stainless steel, the cost of machining the parts in quantity would be prohibitive.

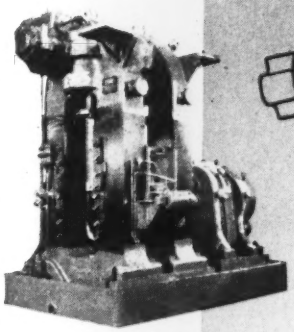
HAYNES precision casting is an ideal method for mass-producing parts that must be made from an alloy difficult to fabricate into intricate shapes by ordinary methods. Sound, smooth castings are produced to such close dimensional standards that the need for finishing operations is minimized. For more information on the types of parts best suited to this process, and for tips on designing parts to be cast by this method, write for the booklet, "Investment Castings."

The efficiency of the starting-rod feeder on this hand-scarfing blowpipe is partly due to the use of HAYNES *investment castings for the critical parts of the assembly*

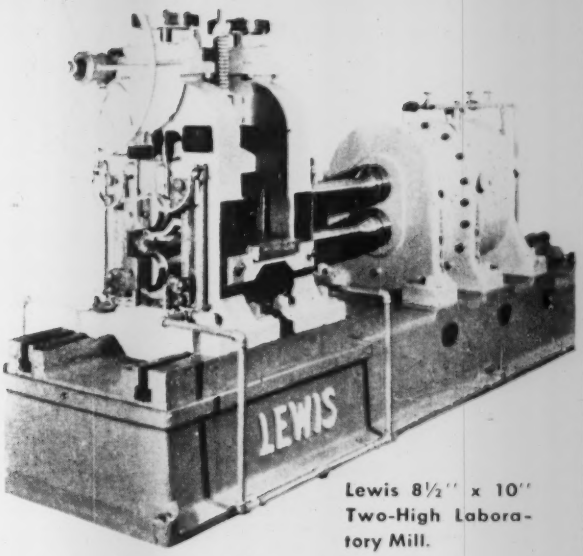
HAYNES TRADE MARK Alloys

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles—New York—San Francisco—Tulsa

"Haynes" is a trade-mark of Union Carbide and Carbon Corporation.

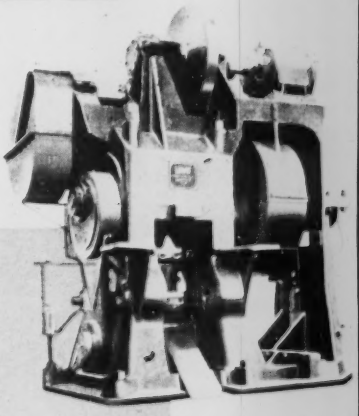


10" and 24" x 20" Four-High Reversing Mill Stands.



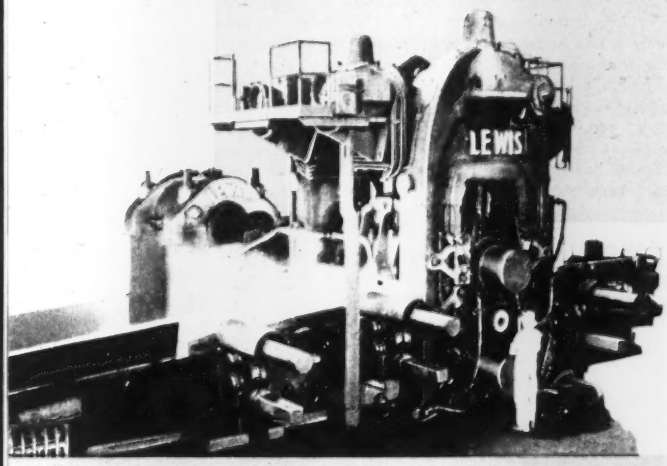
Lewis 8½" x 10" Two-High Laboratory Mill.

LEWIS ROLLING MILL EQUIPMENT



Exit side of Lewis 8" x 8" Up-Cut Shear.

Lewis equipment will meet *all* your requirements whether you are modernizing your plant or increasing your rolling mill facilities. You can call on Lewis for a small laboratory mill, shear or a large plate mill—or anything in between. Lewis' ability to design and build efficient, cost-reducing machinery for rolling steel and non-ferrous metals is known throughout the industry.

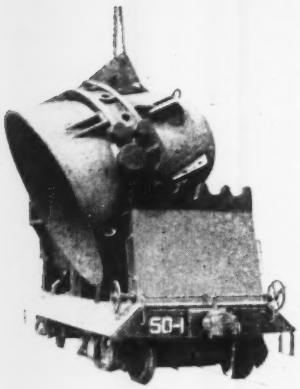


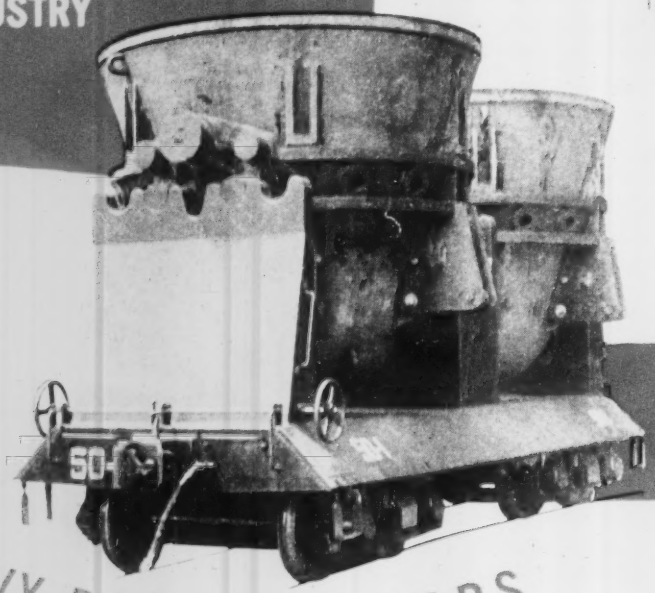
26½" and 42" x 112" Three-High Balanced Finishing Plate Mill.

BLAW-KNOX COMPANY
LEWIS MACHINERY DIVISION
PITTSBURGH 22
PENNSYLVANIA

POLLOCK

LEADING CINDER AND SLAG CAR BUILDERS FOR THE IRON AND STEEL INDUSTRY

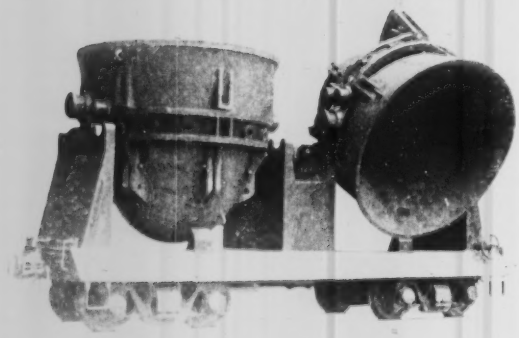




This is one of the Pollock open hearth double-pot slag cars in service at the Edgar Thomson plant of United States Steel Company. Identical equipment will be used in other new plants now under construction.

HEAVY DUTY SLAG CARS

ESPECIALLY DESIGNED FOR TODAY'S OPEN HEARTH OPERATION



● Note the heavier construction used in every detail of this double-pot, crane-dumped car. This extreme ruggedness is a necessity to assure longer life and trouble-free service under present-day big-tonnage production.

In addition to the more sturdy construction, design features contribute to open hearth operational advantages. The unit is unusually compact and permits use with minimum allowances for space clearances. Simplicity of structure reduces maintenance time and retards deterioration. Cradle arrangement permits easier, faster dumping from either side.

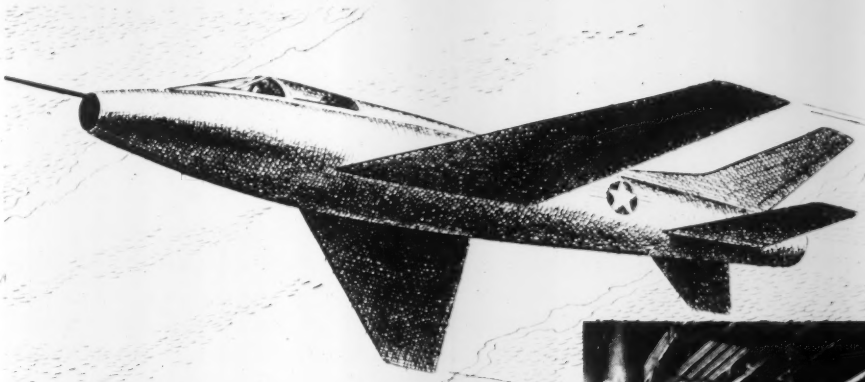
Each pot holds 400 cubic feet which provides 800 cubic feet slag disposal capacity within 29'0" coupler to coupler.

Most new open hearth plants have Pollock hot metal and slag handling equipment because Pollock engineering is geared to mesh with overall efficiency planning. Also for open hearth ladles, ingot cars and charging box cars, consult Pollock before you invest.

POLLOCK
SINCE 1863

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN · OHIO
STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

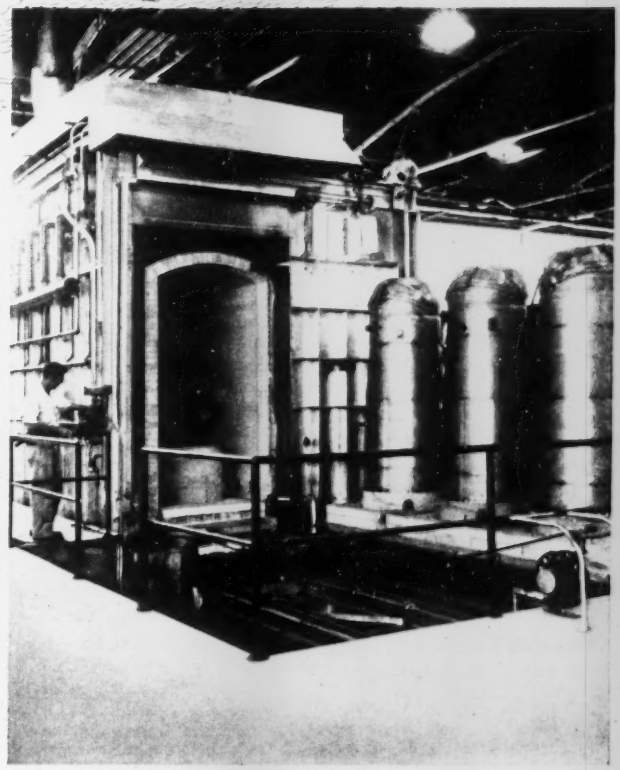
BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES



The precision tool
for heat processing

GAS

makes metals "relax"
at Ryan Aeronautical Company



Gas fired furnace for heat-treating afterburners at Ryan Aeronautical Co., designed by Industrial Systems, Inc., Los Angeles, California.

Throughout industry, GAS is a vital production tool for basic heat processing of metals, chemicals, and ceramics. For instance, in the production of jet engines, Ryan Aeronautical uses GAS to relieve the residual, "locked up," stresses caused by welding and forming processes.

One part in particular, the afterburner, posed a special problem in heat treating for it is substantially larger than other jet engine components. This was resolved by having a special Gas-fired furnace designed and built to Ryan specifications. In this furnace the afterburners are both stress-relieved and age-hardened simultaneously.

In this vital role as a precision tool, the productive flames of GAS are utilized because:

- **processing temperatures are attained quickly.**
- **temperatures are controlled automatically within precise limits.**
- **the furnace atmosphere can be easily adjusted as required.**

This installation is but one of thousands feasible only with GAS—the precision tool for heat processing. If you would like further information on how GAS and Modern Gas Equipment has increased efficiency and improved products, your Gas Industry Representative will be glad to provide it.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK

MORE AND MORE
THE TREND IS TO GAS
FOR INDUSTRIAL PROCESSING

ALUMINUM IS *Why* SMALL PLANES CAN PERFORM LIKE AIR LINERS

As far back as 1930, commercial transport planes were registering notable gains in safety and economy by using constant-speed propellers. By varying the pitch of the blades, engines could be made to deliver 25 per cent more horsepower on take-offs. Cruising speeds could be increased, fuel consumption cut and service ceilings boosted by thousands of feet.

But when McCauley Industrial Corporation of Dayton, Ohio, sought to bring the many advantages of the "air liner" propeller to small planes, engineers were confronted with two problems. The hub to enclose and protect the vital pitch-controlling mechanism had to combine strength with light weight. Equally important, it had to be economical to produce.

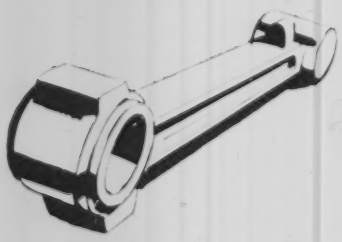
McCauley found the answer in an aluminum alloy forging that saved weight without sacrificing strength. The forging operation yielded a hub of such precise dimensions that only minimum machining was necessary. And the external finish was so fine that a simple polishing operation readied it for final anodic treatment.

Alcoa Aluminum

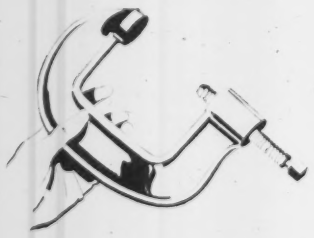
ALUMINUM COMPANY OF AMERICA

ALCOA IS *How*

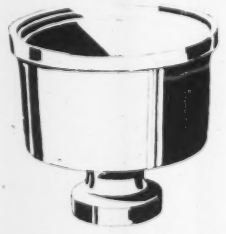
Alcoa's contribution to the new McCauley "Met-L-Matic" propeller started with design counsel, covered selection of the proper alloy and developmental testing, and culminated in production of forgings for both hubs and blades. These services, based on 31 years of aluminum forging experience, can help you solve countless problems where strength must be combined with light weight. Call your local Alcoa sales office or write: Aluminum Company of America, 877-M Alcoa Building, Pittsburgh 19, Pennsylvania.



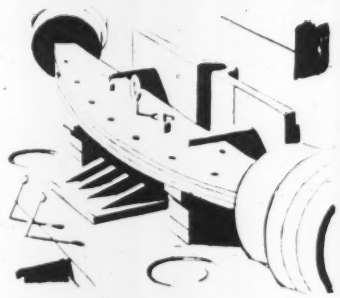
CONNECTING RODS for diesel engines, air compressors and outboard motors are forged of aluminum. They combine maximum strength with minimum weight and size. Because they can be forged to close dimensions, metal removal is negligible.



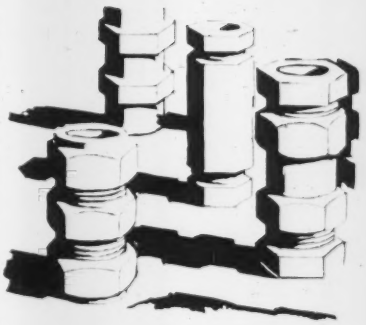
FORGED ALUMINUM tools increase productivity because lightness makes them easy to handle. Using an aluminum forging for the frame of this 12" C clamp cuts weight to 15 pounds, compared to 30 pounds for one made of heavy metal.



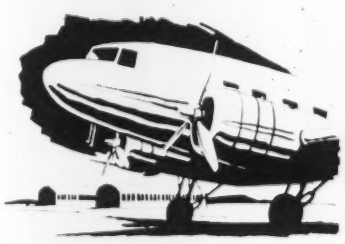
TEXTILE MILLS rely on aluminum forgings for high-speed oscillating parts like this yarn collector. Light weight reduces the power required to accelerate or decelerate, and compact size makes them easy to fit into existing designs.



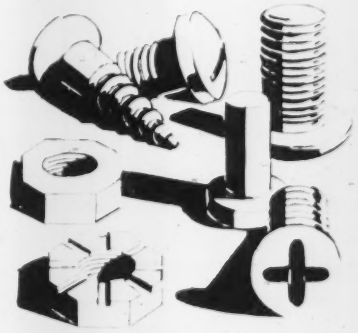
***TOOL AND JIG PLATE**—Forming and bending dies for aluminum shapes are economical when made of Alcoa Tool and Jig Plate. It is a cast product. Stress relieved, with close tolerances of flatness and surface smoothness.



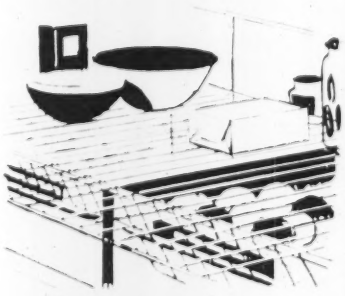
***SCREW MACHINE STOCK**—Aluminum Screw Machine Stock goes three times further per pound than heavy metals. It machines freely—won't rust—is widely used for fittings and fasteners.



ALCLAD PRODUCTS, made by bonding pure aluminum or a special alloy to a base of aluminum or aluminum alloy, demonstrate remarkable resistance to corrosion and are widely used in aircraft.



***FASTENERS** of aluminum are made by Alcoa in every commercial size and shape. A must with aluminum assemblies, they also dress up wood and plastic products.



***WIRE**—Nonstaining, nontoxic aluminum wire is widely used for refrigerator shelves. Its bright, lustrous appearance lasts for years. You get three times more than other metals—pound for pound.

ALCOA® ALUMINUM takes all finishes that other metals will take—plus gleaming, rust-resistant anodic treatments which are best on aluminum.

Products marked* are available from your local Alcoa Distributor listed here

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Hinkle Supply Co.

CALIFORNIA
Los Angeles
Ducommun Metals & Supply Co.
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Denver
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Milford
Edgcomb Steel of New England, Inc.

FLORIDA
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EFFICIENT SLITTING LINES

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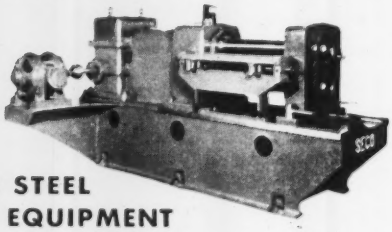
Every facility for custom building efficient slitting lines and cold-rolled strip mill equipment is in the new SECO plant. More and more leading manufacturers are turning to SECO for precision equipment that gives outstanding performance.

Put your problem up to SECO and you'll get the right equipment—with the most efficient features—to meet your specific requirements. SECO engineering ingenuity, backed by the most modern plant facilities, is your assurance of trouble-free, high-production equipment.

SECO engineers, designers and craftsmen have had years of specialized experience in this field. Consultation on your requirements is invited. You're welcome to visit our new plant at any time.



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P. O. BOX 737, WARRENSVILLE STATION
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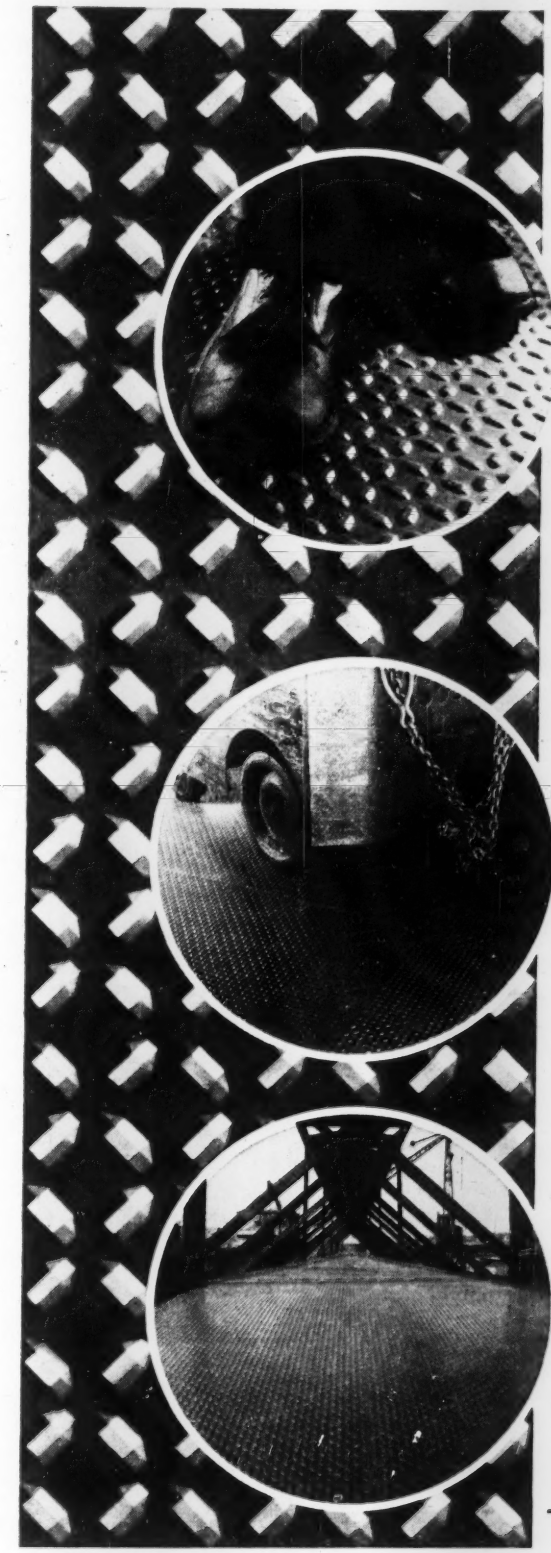

Why run the risk of a fall on the stairs . . .
Why add to upkeep and costly repairs,
When Multigrip gives you traction assurance . . .
When Multigrip Floor Plate has rugged endurance.
Get sure-footed safety that never will cease,
Use Multigrip plate . . . watch your upkeep decrease!

SAFETY FIRST... and always. It's smart business to prevent accidents before they happen. Potential danger spots can be made safer by installing U·S·S Multigrip Floor Plate. The design of Multigrip is such that wherever a foot is placed, there are numerous skid-resistant risers at right angles to each other . . . assuring increased traction at all points. And there are no gutters, no sharp-edged protrusions to catch the toe of a shoe.

With Multigrip plate you receive all the advantages of the strength and durability of rugged steel. This means added economy because of greatly reduced maintenance costs. And Multigrip won't chip or crack or splinter . . . it's *permanent*.

UNITED STATES STEEL CORPORATION, PITTSBURGH
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FLOOR PLATE

USS

Sold by leading distributors from coast to coast

3-2018

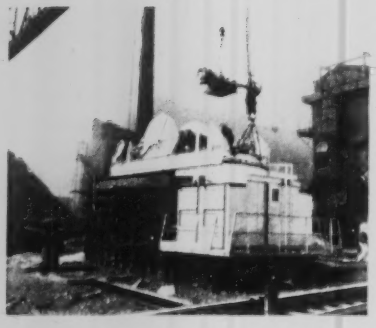
UNITED STATES STEEL

NEW DRAVO LIGHT-WEIGHT MAN TROLLEY INSTALLATION BROUGHT THESE RESULTS AT PITTSBURGH COKE & CHEMICAL . . .

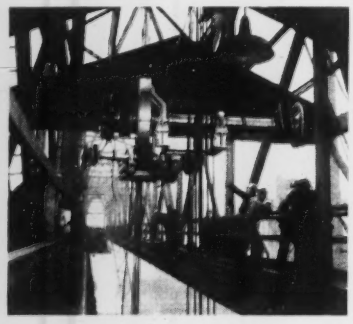
	NEW TROLLEY	OLD TROLLEY
Bucket Ore Load	8½ tons	5 tons
Operating Cycle	50 seconds	60 seconds
Free-digging Tonnage	600 tons/hr.	300 tons/hr.

Early in 1952, engineers at Pittsburgh Coke & Chemical Company foresaw a materials-handling problem which would arise when a new blast furnace was added to the plant's facilities. The existing materials-handling bridge would be unable to keep up with expanded operations when the new furnace began functioning. Dravo engineers were called in to discuss the problem.

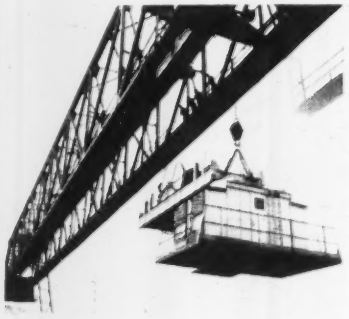
The result was a decision to install a new Dravo light-weight man trolley which would permit using a larger bucket. This increased the bridge's capacity at ⅛ the cost of a new bridge. Installation time was only 13 hours. Here is how it was done.



1 Designed and constructed by Dravo Corporation, the new man trolley was blocked on cribbing below the bridge. Each axle was lifted 75 ft. to the trolley runway.



2 Both axles were left suspended above the runway until the trolley frame with it, attached machinery house and operator's cab was hoisted, placed on runway rails and supported with the trolley jacking lugs.



3 The trolley frame was hoisted into place by steam-driven block-and-tackle. The trolley's all-welded construction with liberal amounts of aluminum used in the machinery house and operators' cab greatly reduced its weight.

4 It took only 13 hours to install the new trolley and remove the old one. With the short time the bridge was out of service, production of the two blast furnaces at the plant was not interrupted.

The installation of a Dravo light-weight man trolley on existing materials handling structures still in good structural condition is the practical way to increase the capacity of ore and coal bridges to meet growing production requirements.

The weight saving factors of the new trolley are utilized in a larger capacity bucket without increasing the over-all load on the bridge. Some of the weight-saving factors include: All-welded frame of corrosion-resistant alloy steel, an aluminum sheathed machinery house and operator's cab, heat treated axles and the use of high-strength alloy components elsewhere.

A new Dravo light-weight man trolley can step up your bridge performance. If you have a materials-handling problem, we will be glad to discuss it with you and suggest a logical solution.

DRAVO

DRAVO

CORPORATION

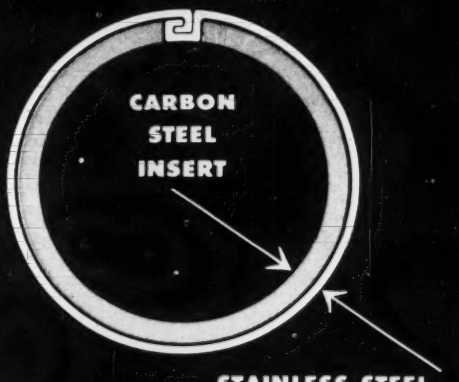
NEVILLE ISLAND, PITTSBURGH 25, PENNA.

●

DESIGNERS and BUILDERS

Bridges and Unloaders • Tower-type Unloaders
Whirler Cranes • Floating Cranes
Dravo Rail Clamps • Barge Shifters
Modernized Trolleys for Existing Bridges

VAN HUFFEL ARCHITECTURAL TUBING



here's the tubing

OF A THOUSAND USES

Van Huffel stainless clad tubing combines strength and rigidity with protection from rust, corrosion and excessive wear.

Using stainless steel lock seam tubing for the outer shell and inserting open seam carbon steel tubing provides the special advantages of solid metals at considerably less cost.

Ideally suited for bus stanchions and grab rails; cafeteria tray slides and railings; or wherever beauty, strength, protection and economy are requisites.

Available in sizes ⅝" O.D. to 1.9" O.D.; Stainless Gauges .018 to .035; Insert Gauges .035 to .078.

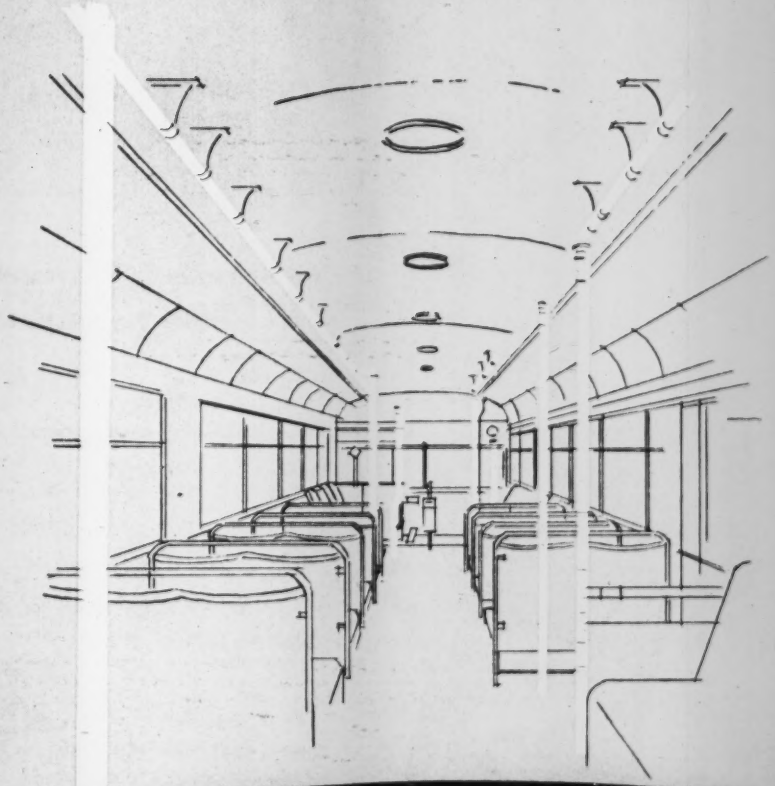
THE ONE TUBING WITH THESE FOUR ADVANTAGES

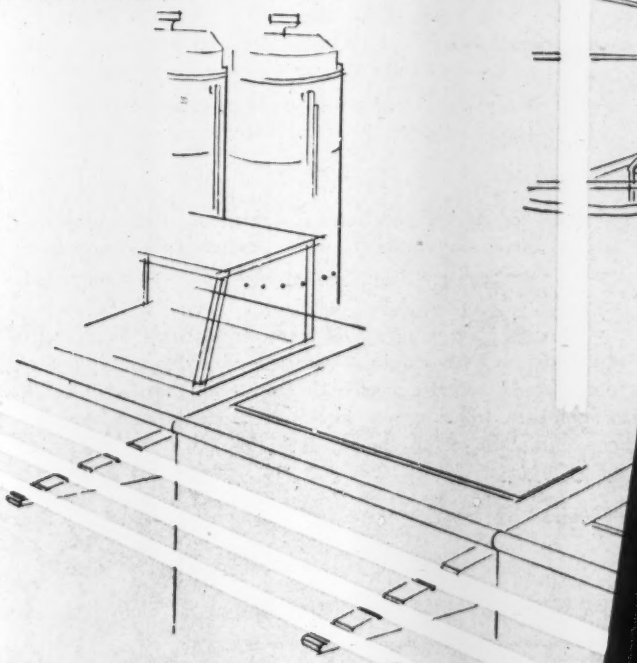
– The stainless steel outer shell provides attractive appearance.

– Never any rust or corrosion to worry about.

– The carbon steel insert supplies the "backbone."

– Costs considerably less than solid metals.





Van Huffel

TUBE CORPORATION • WARREN, OHIO

WHERE IDEAS TAKE SHAPE IN METAL
FOR THE INDUSTRIES THAT SERVE THE NATION

SEYMOUR PHOSPHOR BRONZE

GRADE A (5% tin): Used extensively for springs, diaphragms, bellows, lock washers, cotter pins, fuse clips, clutch discs, screw machine stock, bushings, welding rods, pump rods.

GRADE B (5% tin, free machining): Small gears, pinions, screws, bearings and other similar screw-machine products which must be highly resistant to wear and corrosion.

GRADE C (8% tin): Used for springs on electrical apparatus, diaphragms, welding rod and springs of all kinds where greater elasticity, strength and endurance are required than in the case of Grade A Phosphor Bronze.

GRADE D (10% tin): Applications requiring the greatest hardness, strength and wear resistance of any of the wrought phosphor bronze alloys. Typical applications are diaphragms, springs, paper-mill machinery parts such as jordan and beater bars, rock drill rifle nuts, locomotive bearing-plate liners, fog-horn diaphragms and other similar springs and parts.

Send for your copy of SEYMOUR PHOSPHOR BRONZE for technical data on all Seymour Phosphor Bronze alloys.

Nonferrous alloys since 1878

THE SEYMOUR MANUFACTURING COMPANY, SEYMOUR, CONN.

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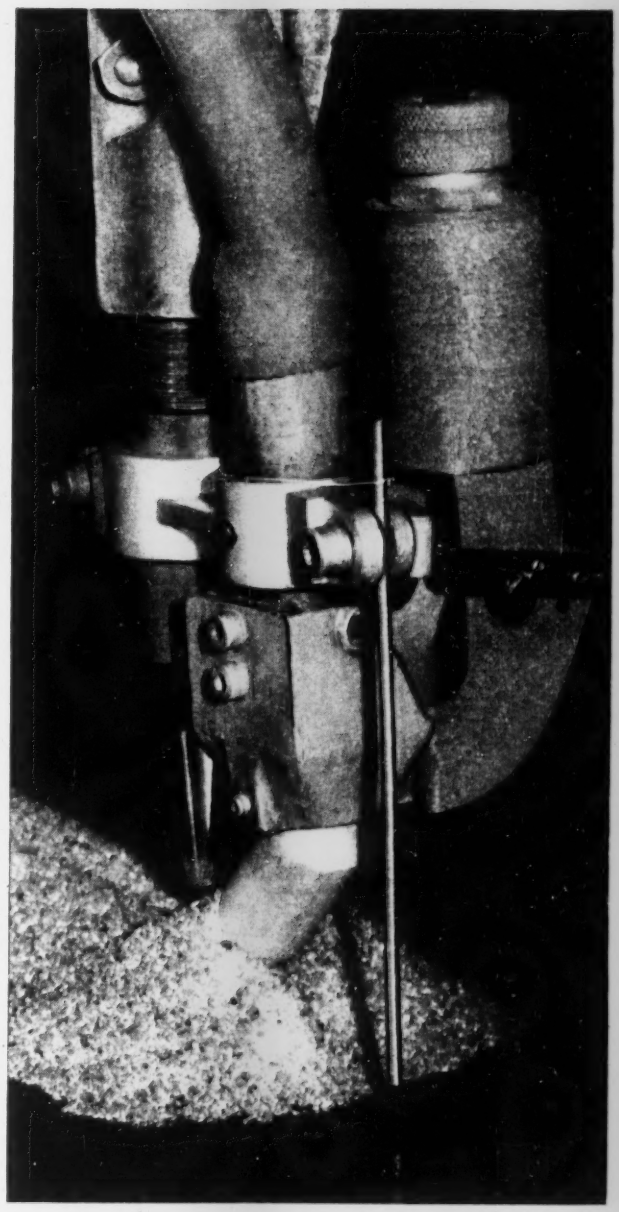
Two important parts of

UNIONMELT WELDING

Trade-Mark

You Can't See



This is UNIONMELT welding—instantly recognized by the special granulated material you see blanketing the weld. *You can't see* the powerful electric arc that fuses the metal beneath at the highest production rate attainable. No sparks or glare disrupt nearby plant activity.

You can't see the LINDE SERVICE that stands behind every UNIONMELT installation to assure its efficient and profitable operation. Only LINDE can give you this unique combination of research, engineering, and over 40 years of welding know-how that is helping LINDE customers save money and improve production. And only LINDE can give you the accumulated benefits of more than 18 continuous years of development, field testing, and improvement in the field of submerged melt welding where it pioneered.

LINDE's Service Engineers will gladly help you design a UNIONMELT installation to meet your exact requirements. They will also be available to help you when a tough production problem comes up. Call your nearest LINDE representative today.

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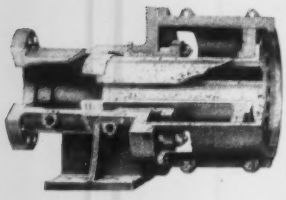
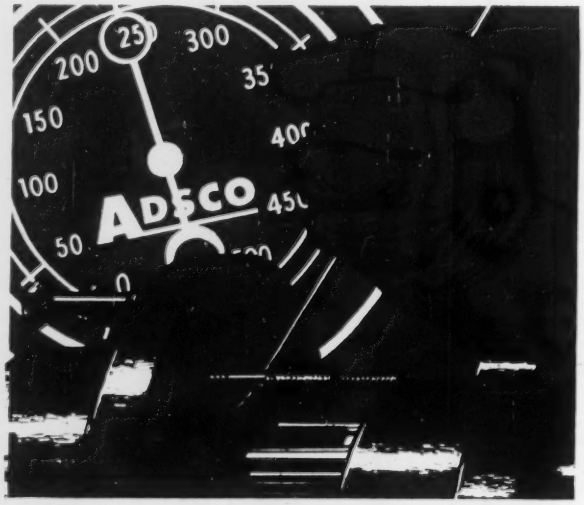


ONLY ADSCO SLIP JOINTS CAN BE UNPACKED AND REPACKED AT FULL OPERATING PRESSURE

• ADSCO is the only manufacturer offering a slip-type expansion joint whose packing can be removed and replaced at full line pressure. In some makes of joints, new packing can be added, but when this packing becomes old, hard, and useless, it can not be removed without first shutting off the pressure . . . Not so with ADSCO's Piston-Ring Expansion Joints, which can be *unpacked* and repacked without the slightest interruption of service. Job is done under normal working conditions . . . but only if ADSCO Piston-Ring Joints are used.

• ADSCO Piston-Ring Joints are available in a full range of sizes, with 4″, 8″, or 12″ traverse per slip, for pressures to 400 psi and greater and for temperatures to 800F and higher. Slip is completely guided . . . split external guide permits smaller manholes . . . limit stops prevent over-travel of slip . . . polished surface can not be scored because slip is in contact with packing only . . . misalignment is prevented by both internal and external guiding.



• Call an ADSCO representative or write for Bulletin 35-15H.

AMERICAN DISTRICT STEAM COMPANY, INC.
NORTH TONAWANDA, NEW YORK
Since 1877

EXPANSION JOINTS • HEAT EXCHANGERS • STEAM TRAPS
STRAINERS • SEPARATORS
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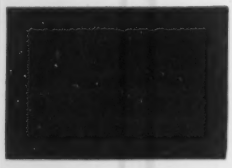

Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact . . . that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it . . . annealed, hard rolled, untempered, scaleless tempered, tempered and polished, blued or strawed.

You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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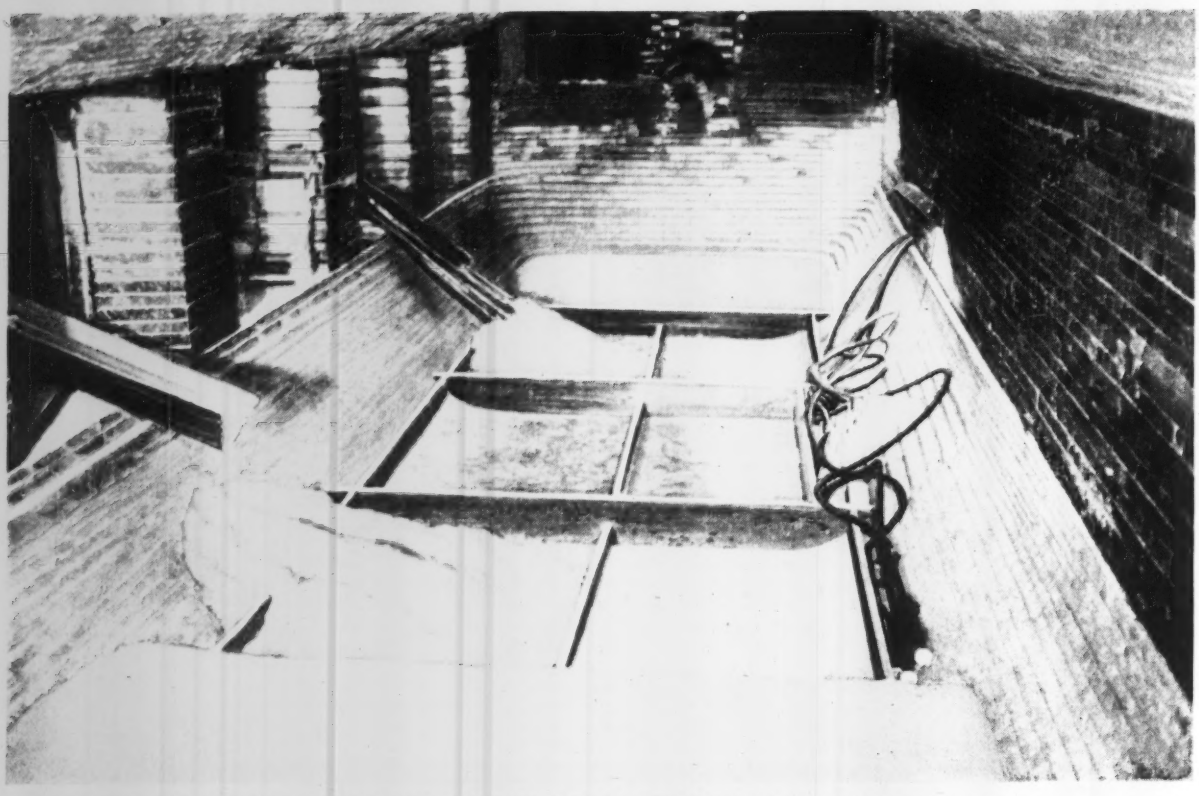
PHOTO BY MCMANUS



OPEN HEARTH SHOWN DURING A SPECIAL BOTTOM INSTALLATION OF PERMANENTE 165 RAMMING MIX

INCREASE YOUR OPEN HEARTH PRODUCTION

WITH PERMANENTE 165 RAMMING MIX!

The superiority of Permanente 165 ramming mix for open hearth bottoms is proved by continuing reports from many of the country's leading steel mills.

Many furnaces are "tripling"... original tap holes are lasting up to 80 heats without repiping ... production records are being broken, with extra tonnage every hour.

Chances are that the proved superiority of a Permanente 165 bottom, based on records of scores of furnaces, can boost *your* open hearth production well above current rates.

SEND FOR BOOKLET giving *all* the important advantages of Permanente 165 and the companion material, Permanente 84. Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage per year, at lower bottom cost per ton. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif. First National Tower, Akron 8, Ohio.

Permanente
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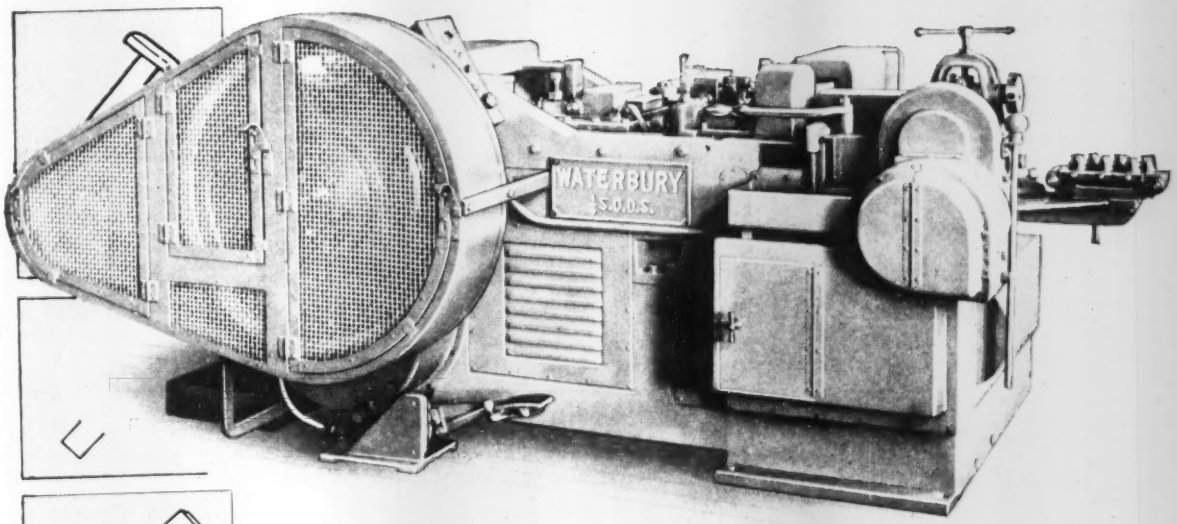
Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

HERE'S THE WATERBURY SOLID DIE DOUBLE STROKE HEADER



¼" Capacity . . . Speed, 150 to 200 Headed Blanks per minute . . .

Another High Speed Automatic COLD HEADER of original design . . . The culmination of over 100 years' experience and "know-how" in the design and manufacture of metal-working machinery, pioneering in the development of COLD HEADING EQUIPMENT.

For further information, write, wire or phone —

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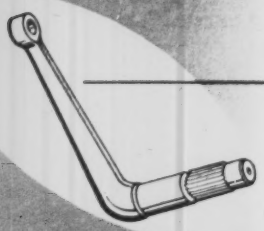
Sales Offices: Chicago, Cleveland, Millburn, N. J.

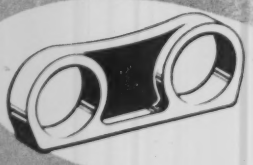
A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

COLD PROCESS BOLT AND NUT MACHINERY — Headers (all types) · Rivet Machinery · Trimmers · Thread Rolling Machines · Slotters · Nut Formers and Tappers, etc. POWER PRESSES — Crank, Cam and Toggle; also Rack and Pinion Presses · Eyelet Machines · Multiple Plunger Presses · Horizontal and Hydraulic Presses, etc. MILL MACHINERY — Rolling Mills: Strip, Rod, Wire Flattening (For Ferrous and Non Ferrous Metals) · Also Slitters · Straighteners · Cut-off Saws · Coilers · Winders, etc. WIRE MILL EQUIPMENT — Continuous Wire Drawing Machines (Upright Cone and Tandem) · Wire Flattening Mills · Chain Draw Benches · Pointers · Swagers · Bull Blocks · String-up Machines · Spoolers, etc.



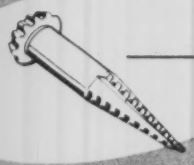
DETROIT BROACH TOOLS STEERING ARMS

Production costs took a sharp turn downward when Detroit Broach tooling started producing the spline on tractor steering arms. Teeth are produced in one machine cycle with simple tooling on an economical punch press.



DETROIT BROACH TOOLS END PLATES

Accuracy climbed and costs slipped when Detroit Broach tooling finished the holes in track end plates. Two holes are machined at once, with accuracy well within specified production tolerances.



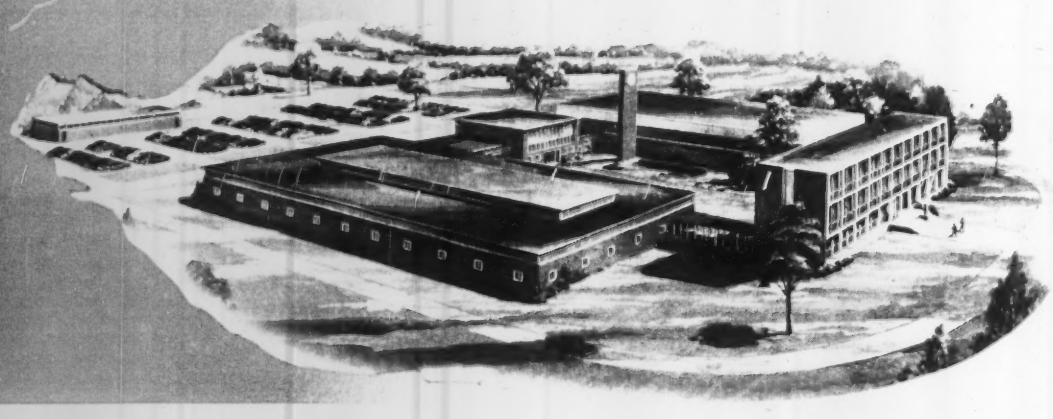
DETROIT BROACH TOOLS COTTON PICKER SPINDLES

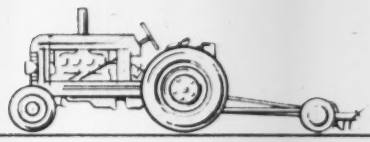
Consistent top notch quality is easy pickin'since Detroit Broach tooling started putting the "bite" on these spindles. Tooth spacing, size, and shape on each flute are consistently identical with important production economies, too.

DETROIT BROACH TOOLS SIDE BARS

Broaching the holes in track side bars is another operation with better accuracy and lower costs since Detroit Broach tooling took over. Size, spacing, concentricity and squareness are within tolerance limits while achieving steady, high-output production quotas.

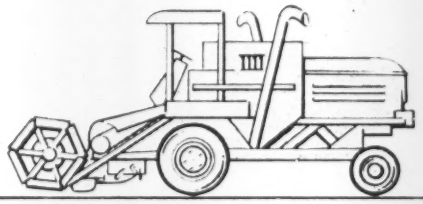
This is a view of the new, ultra-modern Detroit Broach plant and offices located in Rochester, Michigan—just outside Detroit. Designed by Sture Frolen, eminent Swedish architect, it embodies many important advancements that contribute to employee morale and manufacturing efficiency. Another example of the unusual facilities of Detroit Broach Company.





Broaching Pioneers

IN THE FARM EQUIPMENT INDUSTRY



Dependable, work-saving agricultural equipment, at a price practical for the majority of farmers, has accounted for the rapid growth of mechanized farming in the past twenty years.

And one of the important means which equipment manufacturers use to cultivate more production at lower cost is broach tooling from Detroit Broach. A few typical parts which Detroit Broach has tooled for agriculture are shown at the left.

in YOUR industry, too.

there are countless examples of Detroit Broach tooling that is helping to lower the boom on production costs. At the same time, it is tooling which consistently reaps a bumper crop of benefits in terms of closer tolerances with repetitive accuracy, good surface finishes, and low tool maintenance costs.

Chances are that Detroit Broach tooling can do the same for you! You can find out by simply contacting your local Detroit Broach representative or by dropping a line to the home office. There's no better time than right now to do it.

Detroit Broach COMPANY

ROCHESTER, MICHIGAN

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

• *Standard steel's unsurpassed ability to produce weldless rings all the way up to 144" O.D. is one of SIX REASONS WHY YOU SHOULD ALWAYS CALL STANDARD STEEL FOR RINGS AND FLANGES:*

Weldless Rings from 12" O.D. to 144" O.D.

1. TESTING—radiographic tests, tensile tests, hardness tests, ultrasonic probing of internal structure, etc.

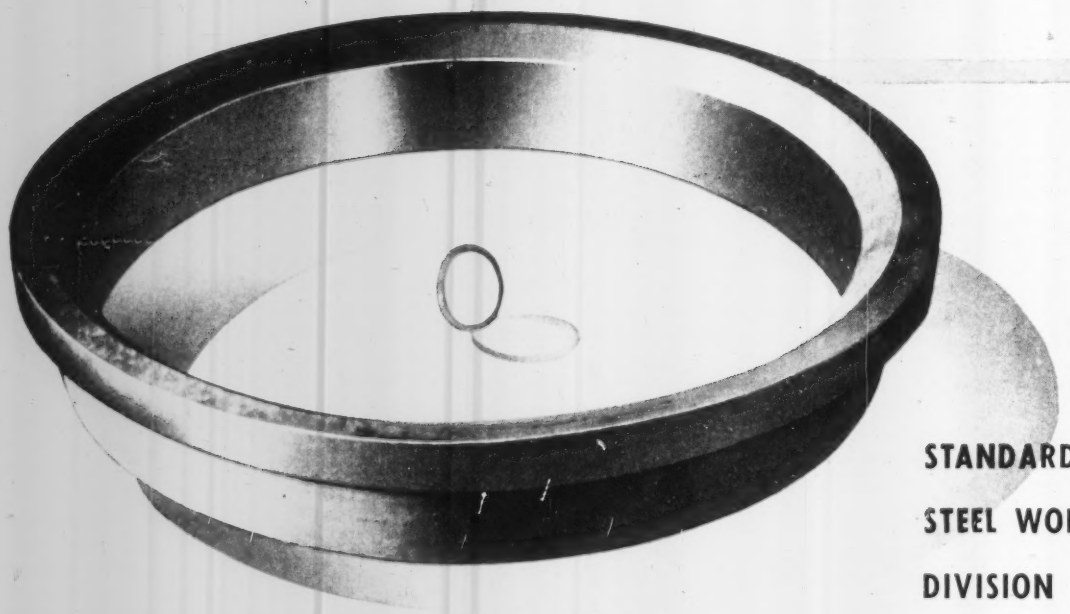
2. QUALITY STEEL—through production of own steel by the acid open hearth process.

3. UNIFORMITY—assured by precise control of forging and rolling operations.

4. CAPACITY—unsurpassed ability to produce weldless rings all the way up to 144" O.D.

5. EXPERIENCE—produced by skilled workmen with 20 to 40 years experience.

6. FAST SERVICE—a vital factor in the continuing growth of Standard Steel for over 150 years.



STANDARD STEEL WORKS DIVISION

Burnham, Pennsylvania

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. Offices in Principal Cities

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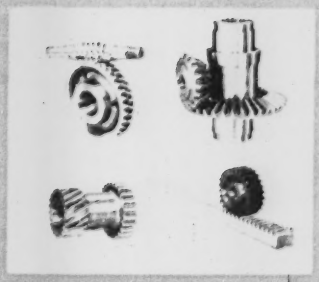
...call ILLINOIS GEAR

Want *real action* on your gear orders? You'll get it when you deal with Illinois Gear . . *action* that guarantees you highest quality and precision . . *action* that assures you on-time delivery . . *action* that offers you around-the-clock production for your gear emergency.

Illinois Gear, the World's largest, most modern, best equipped gear manufacturing plants, offers you the coordinated, synchronized action that makes a champion. It results from broad experience, second-to-none facilities and above all the will to produce!

For action on your gear orders, send them to Illinois Gear.



ILLINOIS GEARS

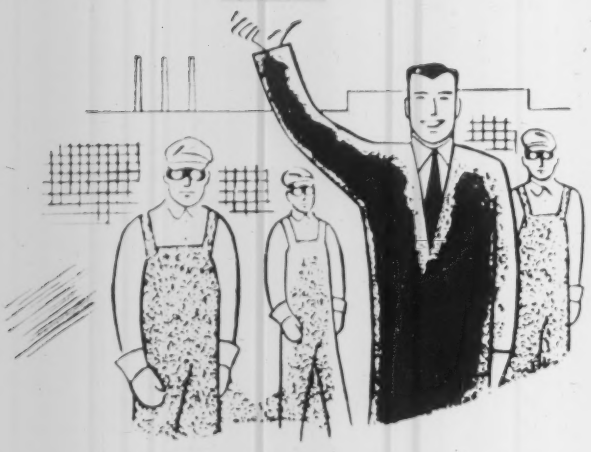
Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

2108 NORTH HATCHEZ AVENUE • CHICAGO 35, ILLINOIS

Only The Commercial Heat Treater Can Give You Complete Service...

To Meet Your Specifications



The reasons for the growth and national acceptance of the commercial heat treating industry are numerous, but fundamentally are based upon one important factor namely "Completeness of Service" from A to Z — all under one roof.

Of equal importance is the fact that this very versatility automatically with time creates an equally wide variety of skills — skills in handling and processing all types of heat treating from simple **stress relief to delicate controlled atmosphere hardening, nitriding, etc.**

In the true sense of the word your commercial heat treater is a "Specialist" with his entire organization established and built around "*Service*."

The members of the Metal Treating Institute are the recognized leaders of the field and comply with the high quality standards established by such a group.

Ace Heat Treating Company
Elizabeth, New Jersey

Anderson Steel Treating Co.
Detroit, Michigan

Benedict-Miller, Inc.
Lyndhurst, New Jersey

California-Doran Heat Treating Co.
Los Angeles 23, California

Commercial Metal Treating, Inc.
Bridgeport, Conn.

Commercial Steel Treating Corp.
Detroit 4, Michigan

Cook Heat Treating Co. of Texas
Houston 11, Texas

The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio

The Drever Company
Philadelphia 33, Pennsylvania

Greenman Steel Treating Company
Worcester 5, Massachusetts

Fred Heinzelman & Sons
New York 12, New York

Alfred Heller Heat Treating Co.
New York 7, New York

Hollywood Heat Treating Co.
Los Angeles 38, California

L-R Heat Treating Company
Newark, New Jersey

The Lakeside Steel Improvement Co.
Cleveland 14, Ohio

Metal Treating, Inc.
Milwaukee 4, Wisconsin

Metallurgical Control Labs.
Minneapolis 7, Minnesota

Metallurgical, Inc.
Kansas City 8, Missouri

Metlab Company
Philadelphia 18, Pennsylvania

Metro Heat Treating Corp.
New York 13, New York & Ridgefield, N. J.

O. T. Muehlemeyer Heat Treating Co.
Rockford, Illinois

Nerl Heat Treating Corp.
South Bend, Indiana

New England Metallurgical Corp.
South Boston 27, Massachusetts

Paulo Products Company
Saint Louis 10, Missouri

Pearson Industrial Steel Treating Co.
Chicago 50, Illinois

Pittsburgh Commercial Heat Treating Co.
Pittsburgh 1, Pennsylvania

The Queen City Steel Treating Co.
Cincinnati 25, Ohio

Reliable Metallurgical Service, Inc.
Cleveland 14, Ohio

J. W. Rex Company
Lansdale, Pennsylvania

Stanley P. Rockwell Company
Hartford 5, Connecticut

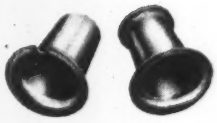
Syracuse Heat Treating Corp.
Syracuse, New York

Vincent Steel Process Co.
Detroit 7, Michigan

Winton Heat Treating Company
Cleveland 16, Ohio

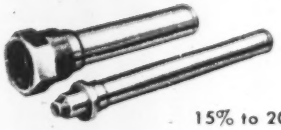
This advertisement sponsored by these Companies which are members of the Metal Treating Institute

How to Fabricate More Profits



From 50% rejects to 1%

10c saved per piece



15% to 20% savings

40% rejects before—now 1%

8c to 10c saved per piece

From 20% rejects to none

This is a story of small change that put folding money in the pockets of a half-dozen fabricators of metal products.

The small change is that of specifying Carpenter Stainless Tubing rather than just "stainless tubing" . . . the folding money is attested by the captions under the pictures at the left.

What is more important to you, however, is the fact that none of the orders were for "specials" . . . all of these pieces were made from "mill run" tubing as delivered by Carpenter.

The moral of the story is, of course, that there *is* a difference in Stainless Tubing—and Carpenter makes it. Why not make the most of this *provable* difference in your own shop—for your own profit. Call your nearest Carpenter Distributor for your next order of tubing . . . plus design and engineering help if you need it. "One Call Does It All."

The Carpenter Steel Company, Alloy Tube Division, Union, N.J.

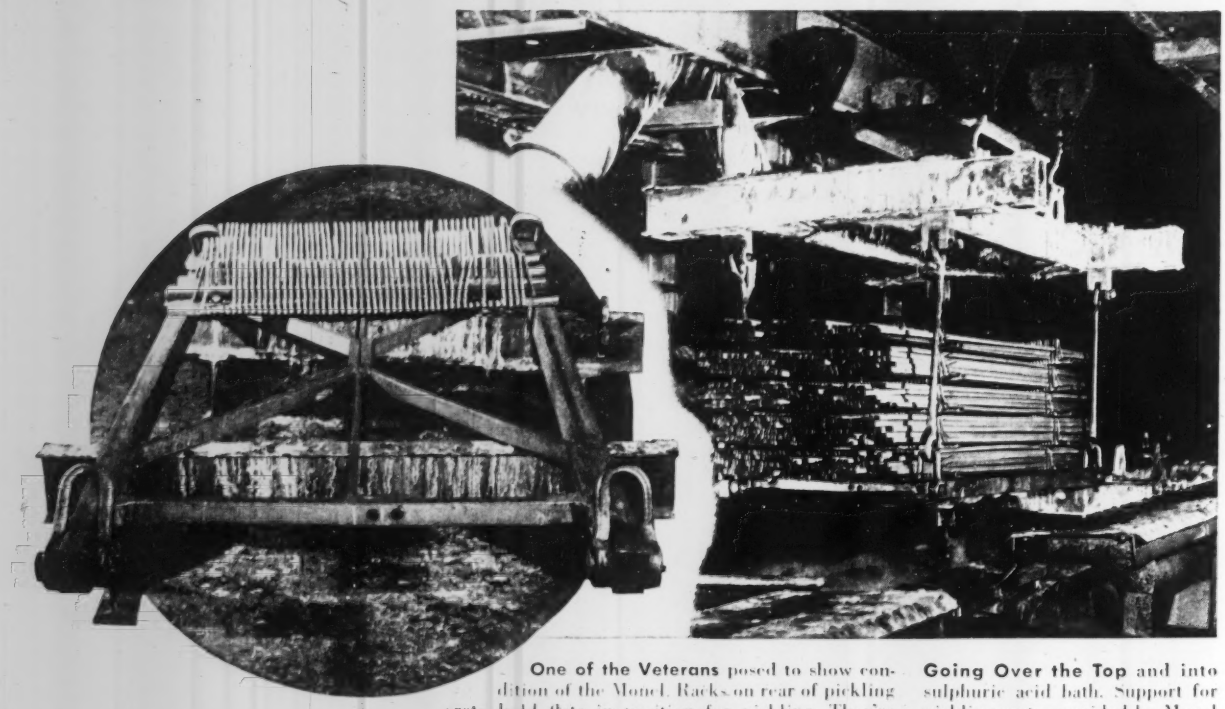
Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.
CABSTEELCO

Carpenter

STAINLESS TUBING & PIPE

Analysis · Tolerance · Finish

• guaranteed on every shipment



One of the Veterans posed to show condition of the Monel. Racks on rear of pickling crate hold flats in position for pickling. They're Monel, too. This crate is being repaired by Strohecker, Inc., Enon Valley, Pa., for still more service.

Going Over the Top and into sulphuric acid bath. Support for pickling crate provided by Monel hooks. Notice corrosion of surrounding equipment not of Monel.

How much *More* life do you think there is...

in this 25-year-old Monel Pickling Crate?

Look it over well!

Check the edges of those old rivet holes! Look at the joints! See what shape the members are in . . . and the lift yokes and pins!

To be fair, we should tell you that the crate has been repaired now and then by Strohecker, Inc. and, as you see, it's welded now, not riveted. We had better say, too, that it is one of 12 left . . . out of 14 Monel® crates bought in 1928.

There is some mystery about those other two crates. No one at Sharon Steel Corporation recalls their exact fate. Perhaps they were damaged somehow and the master mechanic used the Monel to make something else. At any rate, they're gone.

But you can see that this crate has a lot of life left. So have the other eleven. So have thousands of other pieces of Monel pickling equipment used by the iron and steel industry . . . racks, baskets, chains, hooks, stay-rods, and bands.

That is why it is safe to say that Monel is probably the most economical alloy you could use in most kinds of pickling equipment. A little Monel goes a long way. You can make it any shape you want easily. It lasts a long time.

To get more information on places to use Monel in pickling send for the free booklet, "Five Way Savings . . . in Pickling."

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street New York 5, N. Y.

INCO

Monel

PICKLING EQUIPMENT

extra life
extra capacity
extra safety

STEEL

December 14, 1953

Metalworking Outlook

Business from Mathematics

Look for a new business to flourish a computational service designed to solve electronically for a fee those complicated mathematical problems that so frequently tie up personnel and standard equipment in industry. Specialists may go into the business of owning and operating the complex electronic devices that are impractical for most companies to own and that now are chiefly in educational and government institutions. This equipment can solve problems in mathematical design, production scheduling, inventory control and many other fields in a fraction of the time it takes by standard methods. Watch, too, for special-purpose electronic devices that are inexpensive enough for fairly small companies to own for payroll calculating and similar matters. Burroughs Corp. is working on such a device and expects to have it ready a year from now.

In That Direction

A step in the direction of a computational service industry is indicated by a development at Wayne University, Detroit. Some 20 companies in the area pooled their money and services for a unitized digital electronic computer (UDEC) to give Detroit the only nongovernment supported large computational center in the country. The 20 participants expect to get some of their research, engineering and other problems solved there. You can, too, for the service is open to all, for a fee.

Showing Up Already

Developments in electronic calculating equipment mean a shift in product emphasis for the major business machine manufacturers. Burroughs, for example, anticipates sales of normal business equipment this year will be about the same as in 1952. But it expects to sell about $56 million in electronic apparatus this year, against about $42 million last.

How Free Is "Free"?

Long a controversial subject with the Federal Trade Commission, the definition of what is permissible under "free" offers of goods and services has now been liberalized by that body. Previously FTC had prohibited calling merchandise "free" if there were any conditions, even though fully disclosed, which had to be complied with in order to receive such article. Under the new rule, "free" can be used even if there are conditions attached provided all those conditions are clearly disclosed.

The List Is Ready

For the first time, the Defense department has compiled its weapons needs in case of another world war. Office of Defense Mobilization is now translating the figures into terms of the materials that would be needed to produce the weapons. It will take about 60 days to complete the job. Then, ODM can determine how much expansion is needed and where. The list

The Technical Outlook—p. 119 The Market Outlook—p. 171

includes about 1000 major military end items and states their estimated production requirements in each of the first three years of a world war.

Kaiser Consolidates

Kaiser Motors Corp. is consolidating its position. With the sale of Willow Run to General Motors Corp. for $26 million and the raising of $15 million in new capital from private banking sources, Kaiser Motors has reduced its debt to the government to $18,456,000 from the one-time peak of $74,789,843. Its agreement last week to sell its Jackson, Mich., plant to Walker Mfg. Co., Racine, Wis., is a further step in the consolidating process.

One Million Houses in 1954?

Some 1.0 million homes will be built in 1954, compared with 1.1 million in 1953, says National Association of Home Builders. It also predicts that three of every four new homes planned for 1954 will have three or more bedrooms to accommodate today's larger families.

The Business of Government

It would take the equities of stockholders in 29 large corporations to equal the $30.5 billion which is the value of the government investment in business-type enterprises, according to the Council of State Chambers of Commerce. It suggests liquidation of some of those holdings as a means of lowering the nation's indebtedness and getting the U.S. out of business. Furthermore, the U.S. loses taxes from many of the assets it owns. The 29 corporations with stockholder equities comparable to government holdings paid $4.9 million in taxes and $2.1 million in taxable dividends to stockholders in 1952.

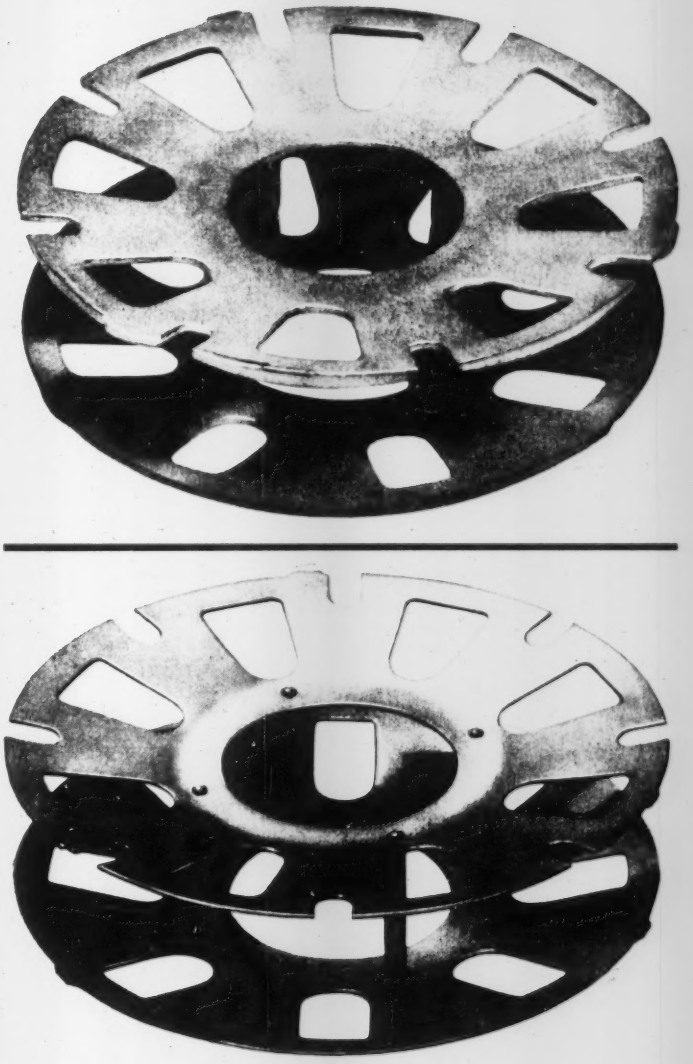
Straws in the Wind

Some foundries plan to shut down for the last week this year; operations at 3 to 4 days a week have been general among jobbing shops . . . The purchase agreement under which Chrysler Corp. acquires 12 Briggs auto body plants has been signed . . . Harvard Business School says business is spending about $3 billion a year on research . . . Capital outlays by U.S. business next quarter will be at an annual rate of $28 billion, about the same as in 1953.

This Week in Metalworking

Railroads expect to spend $1 billion on new plant and equipment in 1954, compared to $1.2 billion in 1953 (p. 77) . . . President Eisenhower's atomic speech last week gives added impetus to private participation in the atomic program (p. 79) . . . The nation needs a comprehensive natural resources program, experts say (p. 80) . . . U.S. Steel Corp.'s Fairless Works may get its first Venezuelan ore in January (p. 81) . . . Erie Mining Co. will start a giant commercial taconite project (p. 82) . . . Slag moves from the waste heap to big business (p. 83) . . . Look for high-fidelity sound reproduction equipment, now largely made on a custom basis, to be turned out on a mass production basis next year (p. 87).

How Stainless Steel Stampings Save Money Here



Cast pilot rings (at top) for an oil-fired circulating heater warped and disintegrated—sometimes after only a few months' service. The rings wouldn't stand up at cherry-red heat, and replacements were expensive.

To increase service life of the pilot ring and reduce costly maintenance, the manufacturer replaced the castings with the stamped assembly shown below. This unit is made of 16-gage Armco 17, Type 430, stainless steel strip and $\frac{1}{4}$-inch diameter Armco 17 spacer rods. The new parts weigh about one-third as much as the castings.

Hundreds of stainless steel applications in high temperature jobs show that the manufacturer can expect to save far more in replacement expense than the additional cost of the stainless steel. Moreover, he will have a new quality sales point.

STAINLESS STEELS TO SUIT CONDITIONS

Armco 17 does well in most fiery jobs—withstands temperatures up to 1550 degrees F without destructive scaling. Yet there are numerous other stainless grades for more severe service than in this oil burner. Certain grades will resist temperatures up to 2000 degrees F. Others have especially high tensile and creep strengths at elevated temperatures. For information on how to select a stainless steel for high temperature service write for the booklet, "Armco Stainless Steels for Heat Resistance."

ARMCO STEEL CORPORATION

4793 CURTIS STREET • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

EC&M Booster Controller used with No. 6, Type SW, 65-inch diameter magnet shown at the right

New EC&M Booster Control Speeds Material Handling...

LIFTS A BIGGER LOAD *Faster* from the Pile—
Discharges it Quickly, too.

EC&M Booster Controllers are supplied with the Type DM "Lift-Drop" (lever-type) Master Switch. The transition from "lifting-voltage" to "carrying-voltage" can be automatically governed by a time-delayed contactor on the Controller-panel, or by manual control of the contactor from a separately mounted push button or foot switch.

Many magnet users are now selecting these new EC&M Booster Controllers to gather a bigger load from the pile. They also get faster magnet operation by a quicker build-up of the magnet-flux under the booster system of operation. When leaving the pile, the load is carried at reduced voltage to the point of discharge.

EC&M Booster Controllers are designed for use with generators capable of delivering a full load voltage of 285-300 volts so that the magnet-terminal voltage will be about 275 volts with the magnet energized. The change of the magnet voltage from the "lifting-value" to the "carrying-value" can be by generator field-weakening or by a series resistor in the magnet circuit: either of which may be controlled automatically, or manually by the operator.

EC&M Booster Magnet Controllers retain the *adjustable* feature for quick release of the load. These controllers can help speed operation and cut costs on new or existing magnet installations. Investigate them today.

WRITE FOR BULLETIN 900

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET ★ CLEVELAND 4, OHIO

Incentive of Ownership

In the *Review of the Society of Residential Appraisers*, R. J. Hughes, vice president of the National Association of Home Builders, cites statistics regarding American homes which will have a tremendous influence upon the growth of our nation.

He states that at the beginning of 1953 there were about 50 million homes in the United States. They are valued at $300 billion, which is about a quarter of the nation's total wealth. Even more important is the fact that for the first time in any large nation there are more people in the United States who live in homes they own than there are people who live in homes they rent.

Think of what this means! The family which owns its own home is proud of it and in most instances is eager to keep it in good repair and to install in it many of the newly discovered comforts of living as they become available at prices that can be afforded. Ownership of a home entails responsibilities, but it also affords independence and numerous freedoms.

That more Americans own homes than rent them should prove to be a strong incentive for hastening the improvement or replacement of existing inadequate homes. As many as 12 million families still live in houses that are deficient on the basis of reasonable standards of health, safety and comfort. Ability of even more people to own homes undoubtedly would be the greatest single factor in gradually ridding the nation of unsuitable housing.

It is unfortunate that this opportunity of owning one's own home is not universal. In Russia, the people are not permitted to own their homes. They are tenants of the state and their harsh landlord is the Kremlin. Is it not likely that lack of incentive, caused by the inability of a family to own its own home, has been a major factor in the tragic fact that, according to U. S. Bureau of Labor Statistics, a Russian worker in 1953 has to work 145 hours to earn enough to buy as much food as 100 hours of work would have provided in 1928—25 years ago?

E. C. Shaner

EDITOR-IN-CHIEF

ACCENT ON DISLOYALTY: Last Monday the Supreme Court of the United States handed down a decision that may help to establish a new criterion on employer-employee relationships. The decision had to do with a fairly simple situation wherein nine technicians employed by a television station, while on strike, distributed handbills criticizing the station and

its programs. The station fired the nine for disloyality.

National Labor Relations Board and lower courts ruled in favor of the technicians, but six of the nine Supreme Court justices held that the station was fully justified in firing the technicians. The majority opinion, read by Justice Harold Burton, contained this memorable statement: "There is no more elemental cause for discharge of an employee than disloyalty to his employer."

And yet, why is it that so many labor union publications habitually run stories which, if taken seriously by customers, would ruin the business of the employers of the union members?

* * *

IRON ORE ON SCHEDULE: Only a few years ago some alarmists were warning us that the high-grade ore of the Lake Superior ranges would run out before our steel industry could arrange for adequate supplies from other sources. Current news indicates that the development of substitute sources of iron ore is on schedule, if not ahead of it.

Bethlehem Steel has been shipping from Venezuela since 1951 and sometime in the first quarter of next year (p. 81) U. S. Steel Corp. will be shipping Cerro Bolivar ore from Venezuela to the Fairless plant on the Delaware river. Meanwhile, taconite processing in Minnesota (p. 82) is moving from the experimental into the commercial stage. Four companies that own the Erie Mining Co. have used 375,000 tons of taconite pellets produced in an experimental plant and now Erie is building a commercial plant designed to turn out 10.5 million tons annually.

There will be abundant ore in time for all foreseeable needs.

* * *

A PERMANENT RECORD? While on the subject of iron ore, one should point out that there is a strong possibility that the record shipment of 95,844,472 gross tons from upper lake to lower lake ports in the navigation season of 1953 will become a permanent record never to be exceeded in the years ahead.

There are several reasons for this. One is that the demand for iron ore in 1954 is likely to be less than in 1953. Another is that more iron ore will be coming to American blast furnaces from Venezuela and other non-Lake Superior sources in 1954 than heretofore. Still another reason is that in the years ahead, shipments by lake carriers from upper lake ports will consist more of concentrates containing up to 64 per cent iron than of native ores averaging an iron content of 50 per cent.

Shipments of ore or concentrates will continue to be a fascinating feature of American industrial activity, but they are destined for drastic change, refinement and adjustment.

* * *

RAILROADS HAVE CASE: A round-up of opinion as to the outlook for American railroads in 1954 (p. 77) indicates that there will be a gentle braking down of volume and activity from the pace of 1953. Corrections of earlier estimates point to an expenditure for improved facilities by the railroads in 1953 of $1.2 billion, compared with $1.3 billion in 1952.

As everybody knows or should know, the railroads, as government-regulated common carriers, are in a strait jacket. They lose millions before an unprofitable operation is permitted to be discontinued by Interstate Commerce Commission. Competing common carriers either are loosely regulated by ICC or may actually enjoy valuable government subsidies. A complete over-all study of the nation's transportation problem is long overdue. Such a study would be bound to give some long-delayed consideration of special grievances of the railroads.

* * *

SCAN SOVIET MARKETS: Americans who read the articles in the present series on the economic outlook of major Western European nations (p. 88) are bound to be impressed with the tremendous importance of foreign trade to their well-being. In Belgium, for instance, the volume of foreign trade fell off appreciably in 1953. This affects the nation acutely because she depends on exports for more than half of her national income.

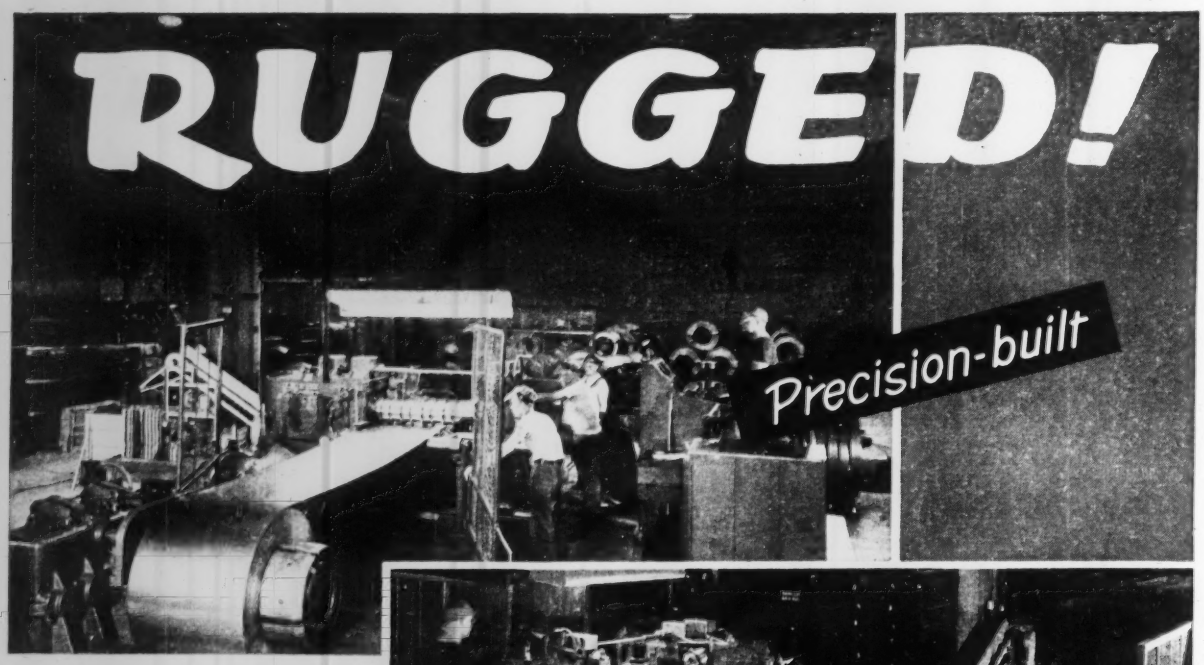
In view of this decline in exports to traditional postwar markets, it is not surprising that Belgium, as well as other Western European nations, is considering seriously the possibility of expanding nonstrategic trade with Soviet Russia and China. Belgium and Luxembourg see in Britain's trade with China and the Franco-Russian trade pact examples that they might follow to advantage.

VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

RUGGED!



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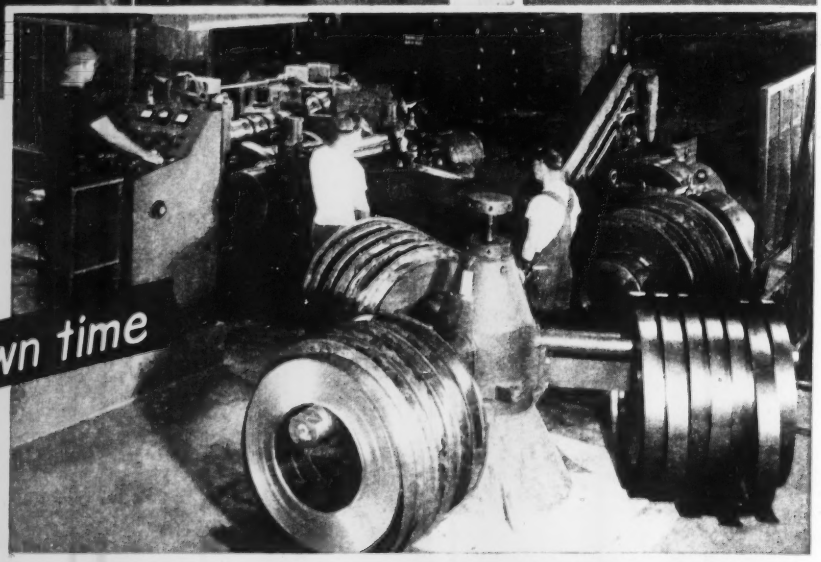

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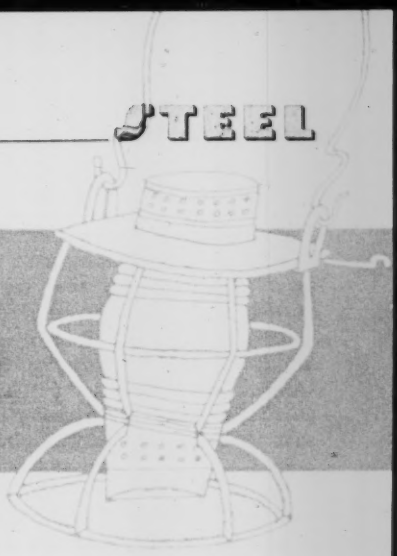
STAMCO, Inc., New Bremen, Ohio

Signals Set—
Railroads Reduce Capital Outlays

EQUIPMENT EXPENDITURES

1954	$1.0 billion
1953	$1.2 billion
1952	$1.3 billion
1951	$1.3 billion



By ERLE F. ROSS
Chicago Editor

SEMAPHORES are set for a somewhat reduced pace for American railroads in 1954. Yet in spite of a gentle braking down, predictions are that the carriers will spend more than $1 billion for improvements, making the seventh consecutive year for an outlay in excess of $1 billion.

The reduction in expenditures next year almost certainly means that the railroads will order and install fewer locomotives and freight cars, will replace less track and will impose a limit on other improvements.

Change—Early estimates of expenditures for improvements in 1953 put the outlay at $1.4 billion to top the $1333 million spent in 1952. But continuing shortages of steel and other materials in the first half of the year, coupled with the Korean truce and subsequent stretch-out of the defense program and a general slowing down in business activity in last six months changed all of that. Estimate is that this year's betterment program will roll up to about $1.2 billion.

William T. Faricy, president of the Association of American Railroads, points out that the carriers face three grave problems "in addition to the uncertainties that beset business in general."

Problem No. 1—The first, he says, is "relatively low earnings in a time of high business activity. In eight years since end of World War II, during which the railroads have spent more than $9 billion on capital improvements, their net income has totaled about $5 billion." This year, "one of the best years from an earnings standpoint, the railroads will earn a return of only about 4¼ per cent on the net investment in their transportation properties."

Since the close of World War II, the rate of return has averaged only a little more than 3½ per cent per year and in no year has the return reached 4½ per cent. This rate is insufficient to attract new capital, especially while other industries are showing a return two or three times as much on the invested dollar.

Mr. Faricy says, "One reason why railroad earnings have been low in a period of high business activity is that railroads are not permitted to adjust their rates and charges promptly to meet general changes in wage and price levels."

Problem No. 2—Second major difficulty railroads face, he says, is "discriminatory" federal excise taxes of 15 per cent on passenger fares and 3 per cent on freight bills. "This tax is collected only from those who use public for-hire transportation and not from those who use their own cars, trucks or barges. Such taxes discourage the use of railroads."

Problem No. 3—The third difficulty, Mr. Faricy says, stems from "the demand for wage increases and enlarged fringe benefits for railroad employees now being pressed upon the companies." A 1-cent hourly pay raise across the board for the nation's rail employees would amount to $30 million a year for the industry, he points out. Five operating brotherhoods and the 1-million-member nonoperating union are currently demanding as much as 10 cents an hour in pay hikes.

Estimated net income of 130 Class I railroads in the first ten months of 1953, after interest and rentals, is estimated as $740 million, 17.5 per cent more than the $630 million in the corresponding period of 1952. Despite these favorable figures, 14 Class I railroads failed to earn interest and rentals in first ten months this year.

A Decline—Freight car loadings have been declining consistently since mid-September from 823,884 in the week ended Sept. 19 to 596,230 in the week of Nov. 28. That trend undoubtly will continue in the first quarter next year. Regardless of the slide, loadings for 18 weeks through Nov. 28 show a narrow gain of 1.6 per cent over the same period of 1952, but they stack up as 5 per cent below the corresponding period of 1951.

For the full year, freight car loadings probably will total about 38.8 million, compared with 37.9 million in 1952, 40.5 million in 1951.

The Reason Why—Currently, loadings are feeling the impact of production cutbacks in steel products, automobiles, household appliances, farm machinery, television sets and the like, also the reduced output of defense goods which has been effected by the government since the Korean truce. Some of the drop in car loadings can be attributed to a decline in coal consumption this fall resulting

from the abnormally mild weather which blanketed the nation.

Another part of loadings loss comes from the low volume of iron ore shipments by rail. A year ago, this traffic was considerable as the steel industry sought to make up shipping losses during the two-month steel strike.

Still a Loser—Railroads of the country cut their operating losses on passenger service a little in 1952, but the improvement represents only token progress toward solution of what the carriers consider a desperately serious problem. Class I roads showed a passenger deficit of $643 million last year, or 5.7 per cent less than the record deficit of 1951.

Attainable Goal? — Currently and for 1954 the freight car fleet goal stands at 1,850,000 cars, same as it was set up in 1950 at the outbreak of the Korean war and reaffirmed in 1952. At one time hope was entertained that the goal would be achieved this year, but continued steel shortages, the truce in Korea and numerous economic influences throttled this hope.

As of Oct. 1, this year, Class I railroads owned 1,754,118 serviceable freight cars, compared with 1,733,952 on Oct. 1, 1952, and 1,724,820 on Oct. 1, 1951.

Fewer Shortages—The combined effect of general improvements in railroad plant and the gain in car supply has been a definite reduction in reported car shortages, even in periods of peak loading. Largest shortage in the year was 5400 cars a day, and this compares with 38,000 a day a few years ago.

It always has been a moot question as to whether it is good economics to maintain throughout the year a car supply sufficient to meet currently all demands of short peak periods. It now begins to appear that insofar as the normal needs are concerned and not taking into account the extraordinary requirements of national defense car supply and demand are approaching and may have reached an approximate balance.

DTA Speaks Up—In October, Defense Transport Administrator James K. Knudson asked the railroads to hike their pool of cars to 1,850,000 by July 1, 1954, as a defense measure. He pointed out

(Please Turn to Page 113)

More Drum-Beating for Annual Wages

The unemployment plan is the No. 1 demand for United Auto Workers in 1955, but it's only part of a depression-proofing program, Washington conference delegates hear

THE GUARANTEED annual wage continues to be the No. 1 demand which the United Auto Workers-CIO will submit for collective bargaining in 1955, but there will be other demands, perhaps one for a shorter work week.

That's what Walter Reuther, CIO and UAW president, told some

MR. REUTHER SMILES NOW
. . . but he sees bad spots ahead

1600 UAW delegates at the union's Full Employment Conference in Washington, Dec. 6-7. The reference to a possible demand for a shorter work week stems from mounting union pessimism about the business outlook.

Good, But — Mr. Reuther acknowledges that production continues at high levels, but he says bad spots have appeared. Soon the UAW will call a conference to prepare 1955 demands, and then the matter of the restricted working time will be threshed out.

The bad spots, according to Mr. Reuther, were revealed by a new UAW survey showing that total employment in 1578 plants in the UAW bailiwick in October was down to 1,269,399 from the 1953 peak of 1,506,160. The union survey tends to show that the Labor department estimate errs in showing unemployment at 1.5 million; the actual number is believed by the union to be closer to 2.5 million. Hardest hit, says UAW, are farm machinery, motor truck, some independent auto and some aircraft plants, jobbing foundries and auto parts makers.

Program—Mr. Reuther sees the guaranteed wage as only one approach toward depression-proofing the economy. Besides GAW, he wants work-creating programs, a tax system which will "favor the little people," broadened social security, adequate farm price protection and bigger unemployment insurance payments to stave off hard times.

The progress report on GAW demand preparations submitted to the conference was a summary of policy determinations at the CIO convention in Cleveland last month and at the annual UAW conclave last March. The basic concept reached at those meetings was that the cost of unemployment must be borne by the employer.

UAW Timing—UAW promises to have its GAW proposals more crystallized late in January after its task group, the Public Advisory Committee which has been doing a lot of the spade work on the problem, meets Jan. 28-29.

As it looks now, UAW will recommend that financing should combine pay-as-you-go with a reserve trust fund to meet abnormal cost. The union will ask that guarantee payments be integrated with state compensation benefits and that the plan be administered by a Joint Board of Administration having equal representation from the union and from management, with a neutral chairman to break deadlocks.

Steelworkers' Ideas—The United Steelworkers of America propose that GAW benefits be paid to laid-off employees with three or more years of service, the weekly benefits to be 30 times the employee's standard hourly wage rate and to

be paid for involuntary unemployment for a maximum of 52 weeks.

Under the CIO's steelworker plan, benefits would be paid from an unemployment benefit trust fund financed by company payments of 10 cents per man-hour worked, the amount to be reduced by an offset value of state unemployment benefits. Total liability of the company would be limited to payments of the specified contribution to the trust fund.

IUE Proposals—The CIO's International Union of Electrical Workers has GAW proposals even less formalized than the UAW's. But it, too, would tie in a plan with state benefits, would limit employers' liability and would want a guarantee for employees after only one year's employment.

It's a good bet that all CIO plans will be tied in with the state unemployment compensation benefits, much as pension benefits paid by companies are now tied into the federal social security system. So, the CIO will soon conduct a campaign at state and federal levels to win legislation, where necessary, for such integration. The reasoning is that GAW will be more palatable to employers if costs can be reduced a bit by the tie-in.

Air Conditioning: A Look Ahead

"Room-type air conditioners are losing ground to central system home units and by 1955 should drop to second place in dollar volume," says S. J. Levine, general manager, Home Heating and Cooling Department, General Electric Co.

He predicts central system units will be installed in more than 120,000 new and existing homes next year compared with about 50,000 this year. In 1953 about 900,000 room-type units will be installed, two-thirds of them in homes and the balance in commercial installations. Mr. Levine estimates annual sales of central system home units will be close to the 1-million mark by 1963.

GE's 1954 line of home cooling equipment features an air-cooled type that requires no water. Waterless types use more electricity, but savings in the water bill about balance out extra power costs.

Private Interest in A-Power Gains

Industrial participation in peaceful uses of the atom look better after President Eisenhower's message to UN. AEC asks private financing for part of atomic power plant

PRIVATE USE of atomic energy has received more encouragement in the past few weeks than it has since the first atomic explosion in 1945. This definite trend was culminated by President Eisenhower's address before the General Assembly of the United Nations on Dec. 8.

In pleading with the UN to turn the power of the atom from warfare to the advancement of peace, the President in effect gave force to several recent attempts of private industry in this country to gain a partnership with the government in the development of peacetime uses of atomic power. In October, the Atomic Energy Commission announced plans to build a full-scale atomic power plant with Westinghouse Electric Corp. as prime contractor.

One More Step—In another step to bring private enterprise into the picture, AEC has invited American industry to submit proposals for investment of risk capital in the steam and electric generating portions of the project. Several important decisions about the program, such as the plant site, have not been made as yet. The attractiveness of the financial proposals may help determine where the plant finally is to be located.

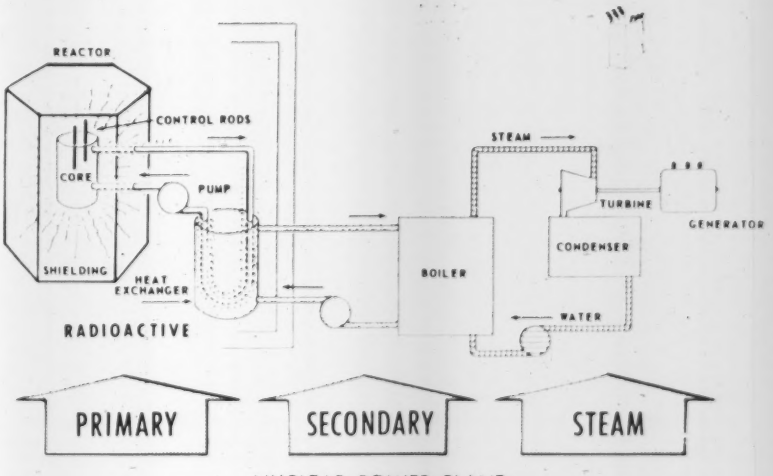
AEC also is considering private operation of the entire plant. Proposals will be received until Feb. 15, 1954.

Added Strength — Eugene M. Zuckert, commissioner of AEC, in speaking before the 58th Congress of American Industry sponsored by National Association of Manufacturers, added strength to the movement when he told the meeting that congressional action should provide for "private ownership of nuclear reactors so that industry can borrow money upon its fixed assets in a normal manner."

He also recommended any legislation be flexible because any attempt "to spell out exactly what may be done and how it should be done would be outmoded swiftly."

Siamese Twins—However, he asserted that atomic energy could not be divorced from government because of what he called its "siamese twin" relationship with defense and the problems of security, safety and pricing policies which would be involved.

In the meantime, another newly established private company has entered the atomic power picture with the announcement last week that the Nuclear Power Co. has



NUCLEAR POWER PLANT
. . . AEC invites risk capital proposals

been formed by five private concerns which "may be interested in building a nuclear power plant," according to J. W. McAfee, president of Union Electric Co. of Missouri, St. Louis. In addition to that firm, the following have equal shares in the new company: American Gas & Electric Corp., New York, represented by its subsidiary, American Gas & Electric Service Corp.; Commonwealth Edison Co., Chicago; Pacific Gas & Electric Co., San Francisco; and Bechtel Corp., a San Francisco engineering firm.

The company will try to select a practical, economical reactor design for electric power production.

Atoms: A Power-Gap Closer

Commercial development of atomic power must be promoted, even though it won't be a major competitor in power generation for years, A. C. Monteith, vice president in charge of Westinghouse Electric Corp. engineering, declares.

In 1963 the power potential will be broken down as follows, the Westinghouse executive believes: 132 million kilowatts in steam power, 32 million kilowatts in water power, 4 million in internal combustion engines and about 2 million in atomic power.

Peacetime Atomic Talks Set

First of a series of international talks on peacetime uses of atomic energy will be at University of Michigan, Ann Arbor, Mich., June 20-25, 1954. Free-world nations are invited.

Available for the first time to them and U. S. industry, research and education will be formerly classified data.

Resources: National Policy Needed

U. S. Production and Consumption of Commodities of the Free World

	U.S. Production		U.S. Consumption	
	1939	1950	1939	1950
Aluminum	27%	51%	22%	63%
Cobalt		4	27	63
Copper	31	38	30	61
Iron Ore	31	51	32	54
Lead	24	29	25	64
Manganese	1	4	31	56
Nickel			51	68
Tin			45	65
Tungsten	13	23	23	65
Zinc	34	33	38	55

Source: Council of Economic Advisors, Midyear Economic Report of the President, July, 1951

GROWING WORLD interdependence that was probably the most significant undercurrent at the 3-day Mid-Century Conference on Resources for the Future which ended in Washington Dec. 4.

Dubbed a talkathon by many observers, the voluminous reports presented at the sessions point up a vital problem to metalworking and all industry executives: How long will this country's resources last and how long will we be able to obtain necessary resources from other nations?

Policy Urgent—Purpose of the sessions was to get the machinery moving toward setting up a national policy in regard to the utilization of resources to assure continued growth of the economic and social health of the U.S. The importance of such a policy is apparent from the table above which shows that the U.S. is consuming not only more metals (and other resources as well) than it produces but also more than half of the production of the free world.

Two world wars, doubling of the population and a five-fold increase in the standard of living since 1900 have placed a tremendous drain on the nation's resources, even threatening exhaustion of some deposits. The result has been an increasing dependence of the U.S. on other countries.

Less Available?—A long-range complicating factor must also be taken into consideration in the tremendous undertaking of predicting the future need and availability of resources: As the standard of living rises for other nations, their resource requirements will also rise. This could result in decreasing resource availability to the U.S.

Conference reports were aimed at presenting as much information as possible and no recommendations or conclusions were expected. Next step, according to Dr. Reuben G. Gustavson, Resources for the Future Inc. president, is to appoint committees to sift through the information to set up framework for a policy on resources.

New Approach to Trade

That's what American Iron & Steel Institute recommends to the Randall commission

IN A STATEMENT submitted to the Randall commission on foreign economic policy last week, the American Iron & Steel Institute recommends a new approach to the handling of this nation's foreign trade problems.

The institute favors the creation of a foreign trade commission to operate on a permanent basis. As envisaged by the institute, the commission would operate, at least initially, under the equivalent of the already functioning Trade Agreements Act. It would absorb, as well, the functions of the present United States Tariff Commission and of the Export-Import Bank.

New Approach — "It does not seem to us that it is necessary," the institute declares, "to choose any one of the previous methods of tariff revision. We believe it is possible to create new instruments which will permit us to proceed in the direction of developing a coordinated foreign economic policy."

The institute statement also takes note of the increasing severity of foreign competition as well as growing trade barriers abroad. It warns that regardless of the demonstrated efficiency of the

American steel industry, and its vitality and adaptability, it cannot meet artificial competition involving unfair trade practices.

"Unfair methods of competition from abroad, such as subsidized and 'state-controlled' exports and the practice of dumping cannot be combated with the ineffective legislation now on the books," the institute states.

Tide Turns—The institute points out that "where the United States has consistently, since the first World War, shipped more abroad than it has bought from other nations, the tide appears now to be shifting and our vast new demands for imported raw materials are rapidly closing the gaps between our imports and our exports.

"In another ten years we may well become again a net importing nation," says the institute.

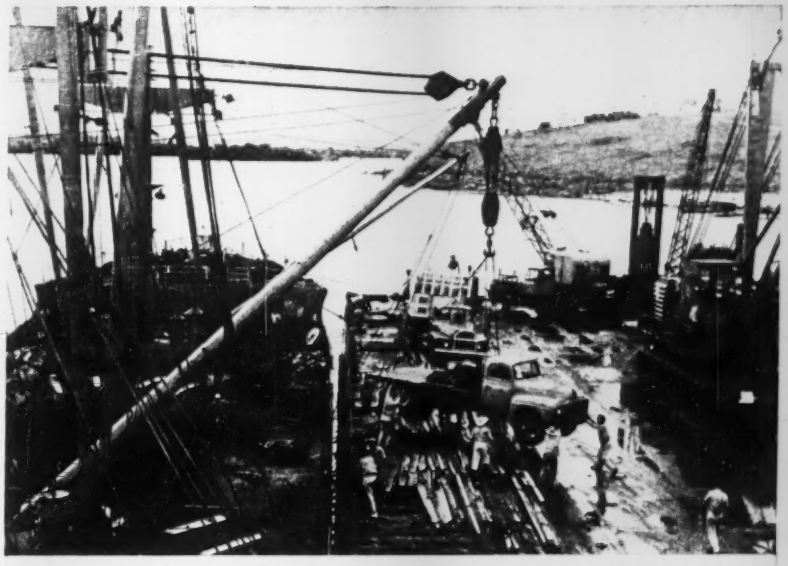
The End of the Dollar Gap

A sharp gain in imports of electrical machinery and equipment in relation to an increase in exports was brought out in a report submitted to the Randall commission, prepared for the National Electrical Manufacturers Association by the National Industrial Conference Board.

Foreign electrical sales here in the first six months ran 50 per cent ahead of the same period of 1952. United States sales abroad in the same period ran only 9 per cent ahead, and actually dropped 7 per cent if sales to Canada were excluded.

Last year imports of this equipment were 11 times higher than before World War II (1935-1939). Exports in 1952 were only five times higher.

"The dollar gap has vanished, at least for the time being," states the report. The board cites a "dramatic improvement" in the dollar position of six of the eight European countries studied. It further points out that United States gold, bank balances and government securities earned (net) by foreign nations during the first half of 1953 would have more than paid for all economic aid extended by the United States during the same period.



In Venezuela, U.S. Steel has the stage nearly set for first . . .

Cerro Bolivar Ore Shipments Soon

VENEZUELAN IRON ORE from Cerro Bolivar will start moving to U.S. Steel Corp.'s Fairless plant sometime next quarter, perhaps as early as January.

Construction of a 90-mile railroad from the Cerro Bolivar deposits to Puerto Ordaz, the new shipping port on the Orinoco river, has been completed, and all other necessary installations are expected to be ready early in January, 1954. Shipments for a while will be at the rate of 2 million tons a year.

Preparations — The Orinoco has been dredged from Puerto Ordaz and along the Macareo channel to the Caribbean sea for a distance of 170 miles so that large ships may go all the way to Puerto Ordaz and carry the ore directly to the U.S. Cerro Bolivar contains an estimated 500 million tons of ore, 58.4 per cent iron. The whole operation will be conducted by Orinoco Mining Co., a U.S. Steel subsidiary.

Bethlehem, Too—Iron Mines Co. of Venezuela, a subsidiary of Bethlehem Steel Corp., has been shipping iron from El Pao, in the same general area, since March, 1951, and thus far has been the only exporter. In 1952, the company shipped 1,906,673 metric tons to its Sparrows Point, Md., plant. In 1953, shipments will be even heavier.

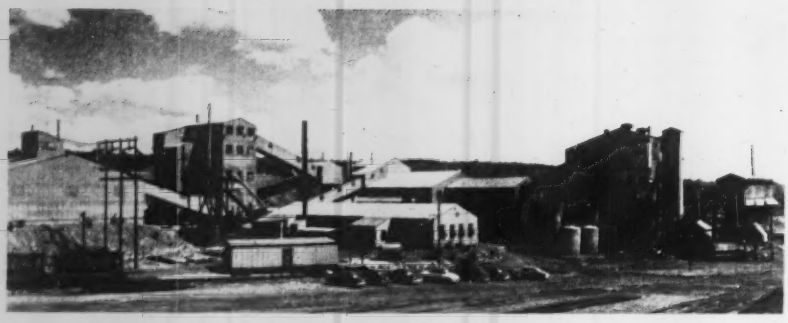
Venezuela Digs — During the first half of 1953, Venezuelan iron ore production reached 1,193,826 tons and exports 999,471 tons. In the first half of 1952, 919,986 tons were mined; 1,969,802 tons for the year.

Foreign Steel Goes Begging

Once sought after by American buyers, now seeking U. S. purchasers that's the story of foreign steel seeking a market in this country.

In Youngstown you can now buy European steel for less than you pay for the hometown product. And the overseas material will come with duty and railroad freight paid, too. International Commercial Corp., New York brokerage firm, offered a wide variety of steel delivered from Antwerp, Belgium, to Youngstown in four to six weeks.

In Detroit, you can buy foreign steel from auto companies' stocks at "substantial discounts" $90 a ton against an average of $110 for domestic cold-rolled types.



After 5 years of tests and 375,000 tons of pellets . . .

Erie Starts Big Taconite Project

Financing plans are completed for a program aimed at producing 10.5 million tons annually. Bethlehem, Youngstown, Interlake and Stelco of Canada back the program

TACONITE processing, ace in the steel industry's hand to bolster its dwindling iron ore reserves, got a new blue chip last week. Erie Mining Co. announced that financing has been completed for its initial development of large-scale taconite producing facilities on the Mesabi Range.

Elton Hoyt II, Erie president, states that work has already begun on the project to be located near Aurora, Minn. The program may eventually lead to taconite pellet production of up to 10.5 million tons annually and involve an investment of more than $300 million.

The Backing—Financing was accomplished through the sale of $207 million in bonds to insurance companies and Bethlehem Steel Corp. Other capital has been subscribed by Erie's four main stockholders, Bethlehem (45 per cent owner), Youngstown Sheet & Tube Co. (35 per cent), and Interlake Iron Corp. and Steel Co. of Canada Ltd. (10 per cent each).

Anaconda Copper Mining Co. will do the engineering and be responsible for the construction of the new concentrating plant. Ore will be hauled by railroad to the plant and unloaded directly into primary crushers. Outbound finished product will be taken by rail to a port which will be developed at Two Islands (to be known as Taconite Harbor) to be loaded on boats.

Tested Successfully — Bethlehem, Youngstown, Interlake and Pickands Mather & Co., which operates Erie, began taconite processing tests in 1931. A large experimental plant was built at Aurora in 1948 where final testing and development was accomplished. More than 375,000 tons of taconite pellets have been turned out successfully there and used by the stockholding companies.

Erie has under its control properties on the Mesabi sufficient for production of ample raw material to protect maximum requirements of the plant for over 50 years.

Two Projects—Erie's is the second large-scale taconite project to get under way in the Mesabi. Reserve Mining Co., owned by Republic Steel Corp. and Armco Steel Corp., is developing a plant at Beaver Bay, Minn., and is aiming at a 3.7-million-ton pellet production by 1957 and ultimately a 10-million-ton output (See STEEL, Feb. 25, 1952, p. 51).

U. S. Steel Corp., too, is in the taconite movement. Its Oliver Iron Mining Division operates a pilot plant for converting taconite at Mountain Iron, Minn.

High Iron Content — The two large-scale projects of Erie and Reserve Mining, when completed, could provide over 20 million tons annually of concentrate pellets containing up to 64 per cent iron. Iron ore consumption this year from the Lake Superior area is expected to hit nearly 96 million tons with the average ore about 50 per cent iron. The taconite converting process now makes available almost unlimited reserves of usable iron units in the U.S.

Deal for Newport?

Merritt-Chapman O.K.'s purchase negotiations, but Newport says agreement is not near

DIRECTORS of Merritt-Chapman & Scott Corp., New York, have authorized negotiations for acquisition of Newport Steel Corp., Newport, Ky. But Newport last week said it had received no official word of any offer.

A marine, heavy industrial and building construction firm, Merritt-Chapman recently purchased Milton Electric Steel Corp., Milton, Pa., and Fitz Simmons & Connell Dredge & Dock Co., Chicago.

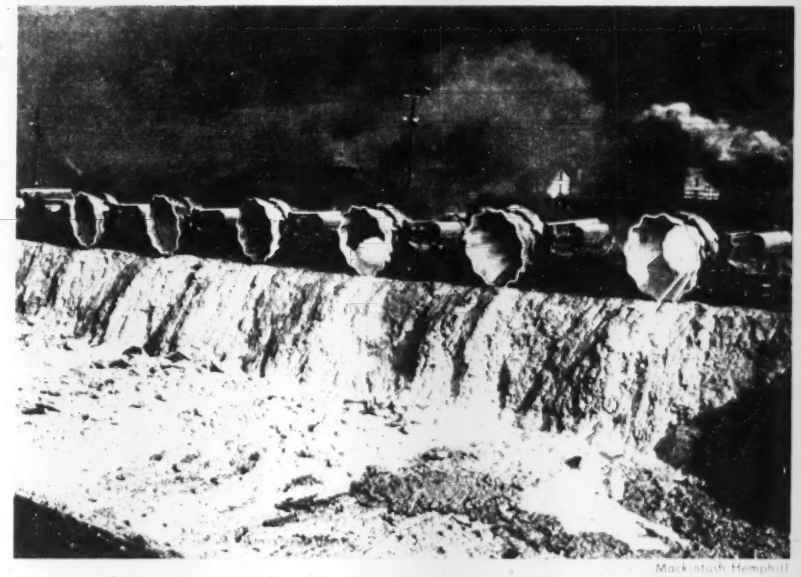
The Company — Newport Steel produces a variety of products, with hot-rolled sheets and coils accounting for 46 per cent of the 1952 shipments. Newport Steel has a wholly owned subsidiary, the Utah Radio Products Co. Inc., which makes radio and television cabinets, speakers and transformers and hardwood plywood.

For Merritt-Chapman the Milton acquisition and the proposed Newport deal would provide an integrated source for its construction requirements and also a market for its large quantities of scrap steel. Merritt-Chapman says it will use 20 per cent of Milton's output.

Capacity—Newport's capacity is about 708,500 tons annually, and 1952 sales were reported at $50.5 million. Milton, formerly the Boiardi Steel Corp., has an annual capacity of 53,700 tons.

Directors of Merritt-Chapman have authorized a stock exchange basis of one common share for each $2\frac{1}{4}$ shares of Newport Steel common.

Following Merritt - Chapman's announcement, Newport officials issued a statement that "reports indicating that a merger or exchange of stock . . . is near approval are without basis." William J. Mericka, chairman of the Finance Committee of Newport, said that as far as he knows no substantial stockholder has indicated willingness to make the stock exchange on the proposed $2\frac{1}{4}$ for one basis.



Mackintosh-Hemphill

A disposal problem is solved; an industry grows as . . .

New Uses Reinforce Slag Markets

Approximately 80 per cent of all slag produced finds commercial use today. Industrymen expect 1953 volume to top 1951's record $36.3 million

ONCE A WASTE product now worth $36 million a year. That's the dynamic story of the American slag industry.

For years slag was considered a waste disposal problem, but concerted research has uncovered a growing list of industrial uses for it. R. O. Dierker, president, Duquesne Slag Products Co., Pittsburgh, says the leading national uses are concrete highways, bridges and other structures, asphalt construction and railroad ballast.

Growth—Blast furnace slag processed in the U. S. rose from 9 million tons in 1939 to 19.6 million tons in 1947 to 29.3 million tons in 1951, according to the Bureau of Mines. Disruptions from the steel strike caused a drop to 26.9 million tons in 1952, but full production this year promises new records. Slag men expect the value of slag this year to surpass the $36.3-million record of 1951.

Slag's success story is not limited to stepped-up steel operations. "Larger percentages of total slag production are finding commercial uses," points out Fred Hubbard of Standard Slag Co. Inc., Youngstown, research director for National Slag Association. Only 61 per cent of slag produced was used commercially in 1947. Today nearly 80 per cent finds commercial use, Mines bureau figures show.

Production—From 75 to 80 per cent of slag used today is screened aircooled material, formed by slow cooling. This slag is crushed and screened after solidifying and cooling. Remaining slag production is divided between granulated, expanded and air-cooled unscreened types in that order.

The steel industry's "once-unwanted by-product," slag is now accepted by virtually every highway specification-writing body in the U. S., R. Kenneth Plumb, slag sales manager, U. S. Steel Corp., Pittsburgh, says.

New Uses Ahead—And research is leading slag into previously unexplored territory. E. W. Bauman, Washington, managing director of NSA, reports his organization is developing a blend of slag sand and natural sand for use in Portland cement concrete, and tests are being made with expanded slag for use in structural concrete and building insulation.

Slag sand, with its high alumina content, is used in manufacture of black opaque glass and amber glass. Several leading glassmakers are developing its use in capsule, chemical and beer bottles.

By the Bag—Granulite Co., Chicago, purchases slag from Inland Steel Co. and granulates it into a liming material for the agricultural market. Slag, too, is displacing other materials in the production of mineral wool for insulation and roofing granules, slag men declare. Slag Co. of America sells roofing slag in 60-65 pound bags to be spread atop roof coating.

One difficulty in the slag picture has been the terrific beating taken by cinder pots or ladles which carry molten slag from steel mill to dump. The pots are not refractory lined because necessary tipping and jolting would jar the lining loose. Mackintosh-Hemphill Co., Pittsburgh, says its corrugated designs in pots are lengthening the pots' lives.

Expansion—Most production improvements now consist of additions to present facilities. Gary Slag Corp., Gary, Ind., has added to its air-cooled processing capacity at its Gary and Duluth plants for making expanded light-weight slag. Duquesne Slag will increase its production 50 per cent at its Duquesne, Pa., plant to meet demand of growing markets.

While slag output depends on the rate of pig iron production (half a ton of slag is produced per ton of pig iron), optimistic predictions for commercial business are plentiful. C. A. Barinowski, vice president of Birmingham Slag Co., Birmingham, says his company's sales have "more than doubled" since 1939, and there are prospects for continued improvement.

Iron, Steel Investment Doubles

Combined total investment (total assets less current liabilities) of 44 iron and steel companies rose over $3.1 billion to nearly $7.5 billion from Dec. 31, 1945, to the end of 1952, American Iron & Steel Institute reports.

Steel capacity for the companies increased about 30 per cent and their long-term debt jumped 167 per cent to $1.26 billion, highest on record.

By E. C. KREUTZBERG *Washington Editor*

Patronage Slowly Dying Out as Eisenhower Backs Career System

DESPITE SHARP criticism from many Republicans, the Eisenhower administration continues to lean over backwards in upholding the integrity of the career system under which competent employees not only have a reasonable degree of security in their present government positions but also can look forward to promotion on the basis of meritorious service. The great bulk of the government employees continue to enjoy all the protection of the Civil Service System. The only changes under this system stem from the President's insistence that his department and agency heads be permitted to man policy-making and confidential jobs with personnel of assured loyalty to this administration.

The Shift to Schedule C . . .

With the approval of the President, the Civil Service Commission is proceeding carefully in transferring such jobs to the new Schedule C which was created last April. So far, department and agency heads have requested that 2017 jobs be classified under Schedule C. The commission has entered 827 jobs under the schedule, rejected 886 on the basis of its finding that those jobs did not involve confidential or policy-making duties and is in process of reviewing the remaining 304.

Actually, few incumbents of the 827 jobs in Schedule C have been replaced. In many cases the department and agency heads are satisfied that they are loyal and competent. In others the incumbents enjoy war veteran preference created by act of Congress. Then, there is another factor; when job seekers find that many of these jobs pay somewhere between $5000 and $10,000 a year they lose interest, because they can do better outside the government. And, of course, few available professional job seekers possess the qualifications necessary to occupy a specialized policy-making job in the government.

Only 176,600 Less . . .

As to rank and file of government employees, they are subject to firing only "for cause" or because of economies voted by Congress. The reduction of 176,600 names, as of Nov. 1, from the 2.6 million on government payrolls when the Truman administration ended was due almost entirely to reduced appropriations by Congress and to failure to replace employees that went off the payrolls by death or retirement or to take other jobs. It is estimated there will be a further reduction of 65,000 to 70,000 in the number of government employees by next June 30 for these same reasons. The number of firings "for cause" is negligible.

What all this adds up to is the fact that patronage, over the long years the big factor in filling government jobs, has become a negligible factor.

Special Employment Service . . .

The administration also has some other ideas about personnel, one of which might help you.

Does your company need a statistician, an economist, a business analyst, a labor lawyer, a personnel officer or some other comparable specialist? In an unprecedented move, the United States Employment Service for the District of Columbia will attempt to bring employers and prospective employees together. It will do this over the period Dec. 27 through Dec. 30 when six professional societies simultaneously will meet in conventions in Washington — American Statistical Association, American Economic Association, Industrial Relations Research Association, Econometric Society, American Marketing Association and the Institute of Mathematical Statistics. For this purpose, USES will maintain a special staff at the Washington Statler.

New Chiefs for Ordnance

Maj. Gen. Emerson L. Cummings, left, has been appointed chief of ordnance, U. S. Army. He was formerly chief of the industrial division, Army Ordnance Corps, the post to which Brig. Gen. J. B. Medaris, right, has just been appointed

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Hi-Fi: New Potential in Metalworking

MILLIONS OF AMERICANS will feel the impact of a comparatively new development in sound in the near future, and metalworking will find itself with a new and potentially large market as high-fidelity reproduction units move from the tinkering or custom-built stage into full mass production.

Already a $100-million business in 1953, volume is expected to double that in 1954 as large producers of radio and television equipment prepare to run the gamut of home entertainment with high-fidelity phonograph, radio and television all in one package. Manufacturers who had all but given up on the radio-phonograph combination in this TV age are climbing back on the bandwagon with these sets which reproduce sound so authentically that even some experts can't tell whether or not it's the real McCoy.

Little and Lots of It—And what is the role of metals and metalworking in all this? Per individual set or installation, weight of metal is relatively little, but the range of applications is broad. More costly installations take upwards of 100 pounds of metal, both ferrous and nonferrous. Many steel alloys are used in parts weighing but a fraction of an ounce. Some designs include small aluminum castings.

Used considerably is an aluminum-nickel-cobalt magnetic alloy (Alnico), notably in loud-speakers. These and turntables account for the bulk of the metal, although motors and transformers need some silicon strip.

Parts A-plenty—Other parts used in "hi-fi" sets requiring metal are pickup cartridges these replace the old-fashioned needle arm and cartridge combinations, changers, tuners, preamplifiers and amplifiers, chassis and other standard electronic parts used in radio manufacture.

While weight of metal used is not large per set, it is vital for circuit assembly as well as for structural strength. Although most parts are stamped, some are drawn, and assembly of chassis usually involves welding and bending operations. In addition to steel and alloys, silver is utilized for contacts, cadmium for plating and some tin is used.

Preamplifiers are vital for tone control and sounds, measured in vibratory cycles per second ranging from the low bass of 30-40 cycles per second to as high as 15,000 cycles per second.

Same Old Problem—The new industry has its problems, not the least of which is cost. Table-model phonographs may be bought for as low as $120, but many hi-fi enthusiasts claim you don't get the real thing until you get in the $1500-$2000 bracket for console and custom-built units. As mass production gets rolling, the price may come down, but some manufacturers claim the quality will, too. Already there are many complaints about "false claims" for mass-produced sets, and Radio-Electronics-Television Manufacturers Association is considering some code or set of standards to regulate these performance claims.

Regardless of claims and counterclaims, high fidelity will hit high notes on the cash register in months ahead. And the industry, which now numbers about 200 companies making component parts, custom sets and mass-production units, will likely experience a mushrooming growth.

More Aluminum in Buildings

Intensive sales promotion supporting relatively new products spurred the aluminum building products industry to a 33 per cent increase in metal consumed in 1953, Edward C. Manix, general sales manager, Nichols Wire & Aluminum Co., Davenport, Iowa, says.

A survey by his company indicates building products would consume 560 million pounds of aluminum this year. Chain-link fencing sales have doubled and increases of 20 per cent or more were made by aluminum nails, window frames, roofing and wire products during the year.

Export Controls Loosened

Exports of nickel-bearing stainless steel have been open-ended for the first quarter of 1954, says the Commerce department's Bureau of Foreign Commerce.

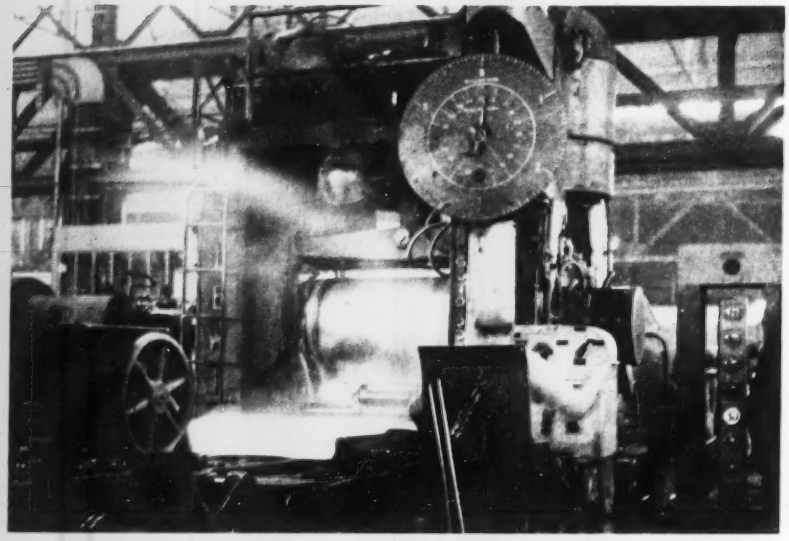
The action follows the revocation on Oct. 7 by the Business & Defense Services Administration of M-80 which had controlled the end-use of those items, and the termination of allocations of nickel. Under open-end licensing, no quantitative limit on exports is set, but export applications are still required. Requests for the first quarter of 1954 and succeeding quarter may now be filed at any time. The move puts all stainless steels on an open-end basis for export.

Steel Curtain Walls Get O.K.

Three large office buildings in Pittsburgh's new Gateway Center development have thin, insulated, steel-faced panels for outer walls, with the result that over 3 per cent more rental area is available as compared to the use of conventional masonry walls, says American Iron & Steel Institute.

The "steel skins" are fabricated in factories and then shipped to the building site.

Productivity, New Markets Are Top European Targets



SHEETS FROM BELGIUM'S D'OUGREE-MARIHAYE WORKS
. . . export trade fell off, so the mills slowed down

BELGIUM

Belgian exports slipped, total steel output declined 10 per cent this year. Belgium readies all out drive for export markets in 1954

IN 1953, Belgium came face to face with the harsh, new reality the years of easy prosperity were gone. Foreign trade declined and that had particular significance for Belgium which depends on exports for more than half its national income.

Exports of steel (excluding manufactures) represented 62.2 per cent of total Belgian output in 1952. And steel exports, which had risen to a monthly rate of 477,100 net tons in 1951 and 501,600 net tons in 1952, dropped to a monthly rate of 451,000 net tons in first half, 1953. Metalworking product exports averaged $31.8 million per month in 1951, $31.6 million per month in 1952 and only $27.4 million per month in first half, 1953. Even more alarming, at midyear new orders for metalworking products for export markets were running but 65 per cent of shipments.

Reflection — The recession in Belgian exports quickly reflected itself in total production figures. Output of steel for 1953 is estimated at 5 million tons compared with 5,607,800 tons in 1952, a drop of just over 10 per cent.

The European Coal & Steel Community pricing regulations did little in 1953 to ease the transition from conditions of world shortage of iron and steel to surplus supplies. Within the ECSC, there were months of haggling over what the minimum price of coal and steel would be (the ECSC sets only the minimum price). At the end of that time, there remained further stumbling blocks such as the compensatory taxes levied by the French government on imported Belgian coal. Late in 1953, the Belgian government appealed to the European Coal & Steel Community Court of Justice for action against these levies which, the Belgians argued, offset the price advantages which otherwise would be enjoyed by Belgian coal.

Off the Cuff—In August, a committee on exports of the ECSC countries, including representatives of France and Belgium, formulated a gentlemen's export price agreement to decide on iron and steel prices for export outside the ECSC. It was decided to maintain the previous levels. However, trade circles reported some Belgian mills followed the French in granting discounts to certain non-European countries in order to protect their relative competitive position.

End product of all this maneuvering was a good deal of confusion and hesitation on the part of steel buyers. Belgians hope the confusion will be cleared away next year and buyers who have been living on stocks will resume their purchasing.

Look Elsewhere — The modernization program of the Belgian steel industry is now, for all practical purposes, completed. Open-hearth furnaces, which averaged 15 tons capacity before World War II, now average 30 tons capacity. Basic bessemer converters have followed the same trend, the majority now being of 25 to 35 tons capacity. Larger ingots are cast and rolling mills are either brand new, like those at D'Ougree-Marihaye and Cockerill, or they are completely modernized. One Belgian firm claims modifications to its mills will improve productivity 40 per cent. With such improvement already in advanced stages, the Belgians are looking in other directions for the means to combat world competition.

Three specific actions by the Belgians trace the outline of the attack being readied for 1954. The Federation of Belgian Industries asked the Belgian government to exempt export industries from payment of social security levies and transmission taxes as a form of subsidy. The FBI says Belgian industry is in principle op-

posed to all forms of government export subsidies and import restrictions; however, the pursuit of such practices by other governments necessitates special aid to Belgian exports. The Belgian minister of the interior responded by recommending longer-term export credits, improved commercial research and "certain" tax concessions for export industries.

A Way Out — Increased trade with Soviet Russia and China were cited by the FBI as another possible solution to foreign trade difficulties of the Belgium-Luxembourg Economic Union. The Franco-Russian trade pact and Britain's trade with China were given as examples for the Belgian government to follow, provided always that only nonstrategic trade be sought.

Finally, Belgium set up compensatory taxes and quotas on Netherlands products to protect Belgian industries which must pay higher wages and more social benefits.

All Out—Thus Belgium is increasing tariff protection to its domestic industries, increasing aid to exporting firms and seeking every possible outside market. It adds up to one thing: Belgium intends to go all out to expand its export markets in 1954.

FRANCE

French exports dropped faster than imports during 1953. A modernization plan and U. S. aid are French hope for next year

FRANCE ATTACKED its number one trade problem—a $1.2-billion import deficit in 1952—and made substantial progress in 1953. First half deficit for 1953 was only $140.7 million compared with $478.4 million in 1952.

To accomplish that, France reestablished some tariffs which had been reduced last year, imposed import quotas on many items such as the 250-unit-per-year limit on German Volkswagen cars and restricted the use of dollar credits accumulated by French exporters.

Hard Hit—By the end of the third quarter, however, it became apparent that exports were declining faster than imports. Exports dropped 14 per cent from second to third quarter, 1953, from $666.7 million to $573.9 million, imports were down only 8 per cent, from $793.3 million to $725.6 million.

Futhermore, metal products, machinery and equipment were the

FRENCH AUTO OUTPUT
. . . a decline despite price cuts

hardest hit in the slowdown of exports, accounting for more than half of the $92.8-million drop.

Somber Tone—As might be expected, French metalworking activity declined in both basic steelmaking and fabricating industries. The few bright spots such as the revival of the aircraft industry which regained an index of production of 100 (equal to that of 1938) thanks partly to off-shore procurement contracts from the U. S. and increased extraction of bauxite did little to lighten the somber tone.

Output of crude steel for the first three quarters of 1953 slipped over 6 per cent to 8,231,300 net tons from 8,779,100 net tons in the comparable period of 1952. French car output, despite an average 10 per cent price reduction, dropped from 325,049 units in the first eight months of 1952 to 315,759 units in the first eight months of 1953. Machine tool activity was greatly reduced from levels of the past two or three years.

French Outlook — Frenchmen view the slack in 1953 metalworking activity as only partially resulting from more intense external competition. Partly, this year is looked upon as a transition period from the first five-year modernization plan of French industry to a second plan. The first Monnet plan, as it was called, dealt mainly with basic industries of which the steel industry was the most important. From 1945 to 1952, $731.5-million was invested in it.

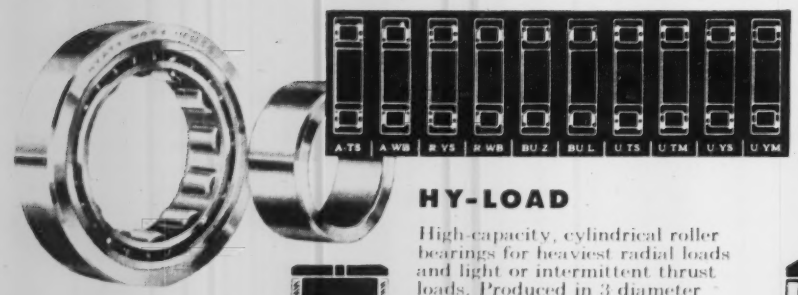
The second five-year plan of modernization and re-equipment will deal with the manufacturing and processing industries. Projected are investments of $2,571,500,000 over the period of 1953 through 1957. A little more than half of the total, or $1.3 billion, will be for the metalworking industries machine tool builders, railroad equipment makers, automobile manufacturers, electrical equipment producers, foundries, agricultural machinery makers, etc.

The Goal—Under this plan, it is hoped to increase metalworking output by 25 to 30 per cent and boost exports of such products by 40 per cent by 1957.

In the meantime, France will certainly not turn down any offshore procurement contracts which amounted to $693,435,000 in fiscal 1953, largest amount awarded to any single country. It's estimated, for example, that one-third the tonnage of French naval vessels now under construction is for OSP contracts. In addition, French firms have most of the $50,195,000 worth of contracts awarded to Switzerland in fiscal 1953 on subcontract.

Helping Hand—Frenchmen are confident that their policies of tightening controls on imports, reducing prices wherever possible and particularly the second five-year modernization plan for manufacturing industries will turn the tide against their old hex the import deficit. Until then, they say, France will need outside aid.

HERE are two more articles in a series on the economic presents and futures of major Western European countries. On Dec. 7 we wrote about Italy and Sweden. Next week we discuss Great Britain and West Germany



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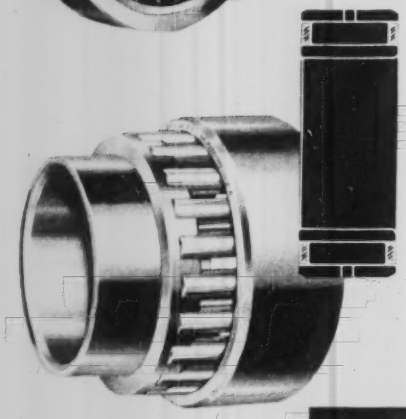

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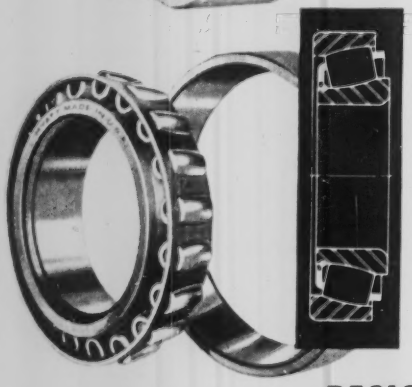

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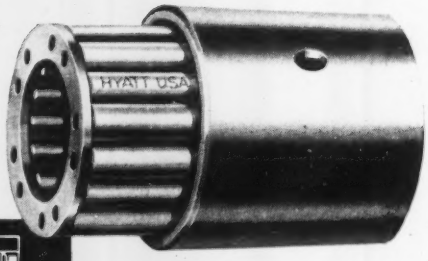

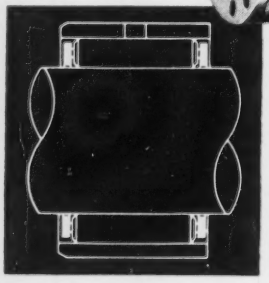

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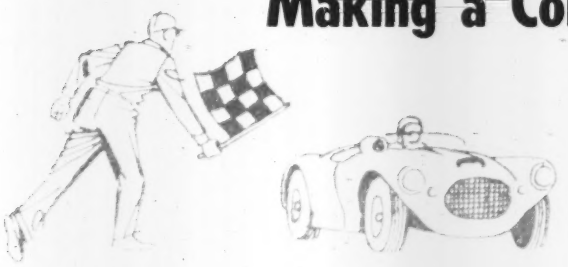
Why Is U.S. Sports Car Racing Making a Comeback?



WEST PALM BEACH, FLA. A SPORTS CAR is by definition an automobile designed for road racing as well as town chores.

The Cunningham Vignale, described last week, is a sports car and can be raced with success, but the first-string Cunningham competition machines are further along a continuum toward the racing end of things. As a result, these cars are built in an entirely separate installation and on the trip there, it is interesting to reflect back on the heritage these cars perpetuate.

The History—Few still remember the first road race in this country. Run on Thanksgiving Day in 1895 from Chicago's Jackson Park to Evanston and return, this snow-harried hassle was won by Charles E. Duryea averaging 7.5 mph. Just ten years later the speed jumped to a 61.5-mph average in the second Vanderbilt Cup Race, and in 1908, a 4-cylinder chain-drive Behemoth with a 7¼-inch bore and 6¼-inch stroke topped 100 mph on the straights to win with an average speed of 64.4 mph over a 260-mile course on rutted roads with half a dozen pit stops.

In addition to the Vanderbilt Cup Races, such events as the Elgin National Road Races, the Cactus Derby and hundreds of challenge matches kept grandpa highly entertained. Not only did the money boys of the time have a great deal of enthusiasm for this new kind of horse racing, but such astute pioneers as Winton and Ford realized that road racing publicized their vehicles in a way nothing else could. Road races proved the practicality of the American car.

The Evolution—As a result the automobile was speeded on its evolution from a luxury to a domestic tool, and road racing began to lose it usefulness. Cars were being designed more and more to appeal to the woman and with the advent of the depression, money was lacking to maintain it purely as a sport.

In all probability the advent of the war was the biggest single factor in the revival of road racing in this country. Road racing had never died out in Europe as in the U. S. because the automobile remains in a luxury position, and the prestige gained by winning races means money in the till to the European car builder. Many a customer in the monied class abroad buys his car because one like it won a race. Not only were some GIs exposed to this different automobile, but the war also created a dollar-passion in Europeans which led them to push their unique hardware in the United States.

The Cunningham Start—Briggs Cunningham, who had already made a name for himself in yacht racing, sampled the European offerings and decided to build a car of his own. In December, 1950, a building was rented in West Palm Beach, and with ex-midget racing driver Phil Walters as general manager, the project was begun. About three months were consumed in hiring a staff of engineers and getting equipment into the plant. Yet within the following three months, three Cunningham cars had been designed from scratch, built, tested and were competing in the LeMans Race in France.

The racing department today looks like a large, white farm building from the road. This facade tends to discourage the local and tourist gentry from excursions to ask, "Whatcha doin'?"

Little Detroit—Within the building, however, is a miniature Detroit research and development section amazingly complete in every detail. Machine tools and metal forming equipment as well as an engineering staff and staffs of engine, chassis and body craftsmen are neatly departmentalized in the building. Many of the personnel, incidentally, are retired Detroiters thoroughly happy in their Florida job-hobbies.

So complete are the facilities that there's an upholstery department where the all-important racing seats that must keep men comfortable for hours of high-speed driving are built. Every part of every Cunningham design is made from a blueprint rather than by cut and try, and one room of the building houses a clay modeling room where scale bodies of projected designs are created.

Movable—In the main room in the center of the building are a van which transports the complete machine shop to racing events and the current Cunningham factory team of racing cars—two C4R's and the C5R. Each car is thoroughly dismantled after every race and visually or physically checked to be sure that no failure or incipient failure condition is present. Dents created in the aluminum bodies by flying gravel must be pounded out and repainted. In traveling at speeds of 150 mph, which these cars can readily attain, even a small stone plays hob with a body and can affect wind resistance markedly.

Over by one wall was a platform with a bucket seat and steering wheel attached. It requires an effort of about 50 pounds to turn the wheel and the Cunningham drivers

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Auto, Truck Output

U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,479
July	757,595	226,434
August	644,152	322,755
September	605,228	595,715
October	654,453	656,767
November		548,782
December		569,715
Total		5,989,509

Week Ended	1953	1952
Nov. 7	133,783	143,610
Nov. 14	145,748	146,825
Nov. 21	108,252	129,224
Nov. 28	74,290	117,315
Dec. 5	124,659	129,005
Dec. 12	128,000*	124,590

Source: Ward's Automotive Reports
*Estimated by STEEL

keep their arm and shoulder muscles in condition by 100 turns of 180 degrees every day. And speaking of drivers, their role is largely that of a mechanical man during a race.

"We know what our cars can do and what the course will permit," says Phil Walters. "One lap of the circuit at LeMans is about 8.5 miles, but if a driver varies by more than two seconds from our calculated lap time we know that he is not following our instructions and find out why."

Scientific—Chuck Stevenson and Clay Smith, whom we had an opportunity to chat with a few nights ago, confirm substantially the same thing in connection with the Mexican road race from which they had just returned. "There are over 6000 turns in the first two days," says Clay, "and every one of them must be accurately charted and called off by the co-pilot to the driver during the race. The driver must know how fast he can take the corner, and to get that information we traveled more than 9000 miles before the race ever began."

The Mexican road race is fast becoming the world's top racing event, and the depth of the Cunningham organization coupled with the careful preparation hinted at by Clay Smith give some idea of the contrast of road racing today compared with the early days. Perhaps the most significant thing is the fact that once again road race results are being publicized by participating auto companies to help sell cars in this country and that factories are participating in racing in ever increasing scope and number.

Change by Detroit?—While the Cunningham racing department looks certain to produce the top road racing machines in this country for many years to come, increasing competition in sales could lead once again to prestige-building Detroit road machines. The Corvette is a step in that direction and at least two others are reportedly in the mill. Road racing could be on the way back in this country, and the Cunninghams are showing the way.

The Mercury Soars

Following on the heels of the best months in its sales history, Mercury announces a crop of new features for 1954 deserving of considerable attention by the potential car purchaser.

The not-very-secret OHV V-8 bowed in, but with 161 hp, which was higher than generally expected. This should do much to make the Mercury the traffic light terror it was back in 1939 and 1940. Also an innovation was the Sun Valley model with the transparent front top. One of the first new things since the hardtop, it's definitely in the category of mixed blessings but shows they're trying.

Among the less-touted improvements is the adoption of the ball-joint suspension, but an all-too-brief test drive of the car indicates the machine is going to have handling to match its performance. Lengthening of the rear quarter panel and a new set-in tail-light with grill modifications help somewhat in separating the car from its too brotherly looking Lincoln, but there's still work to be done in that department, say sources close to the problem.

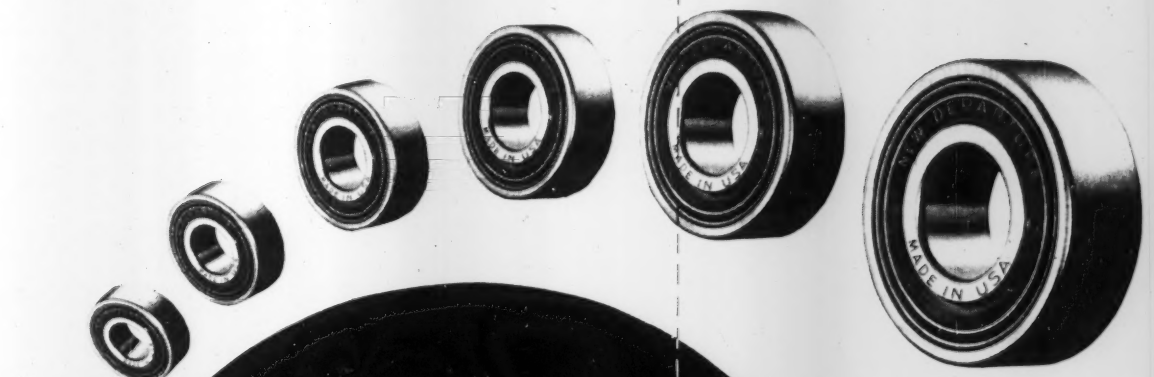
Anyhow, the Mercury went up in 1953, and 1954 looks like a hot year.

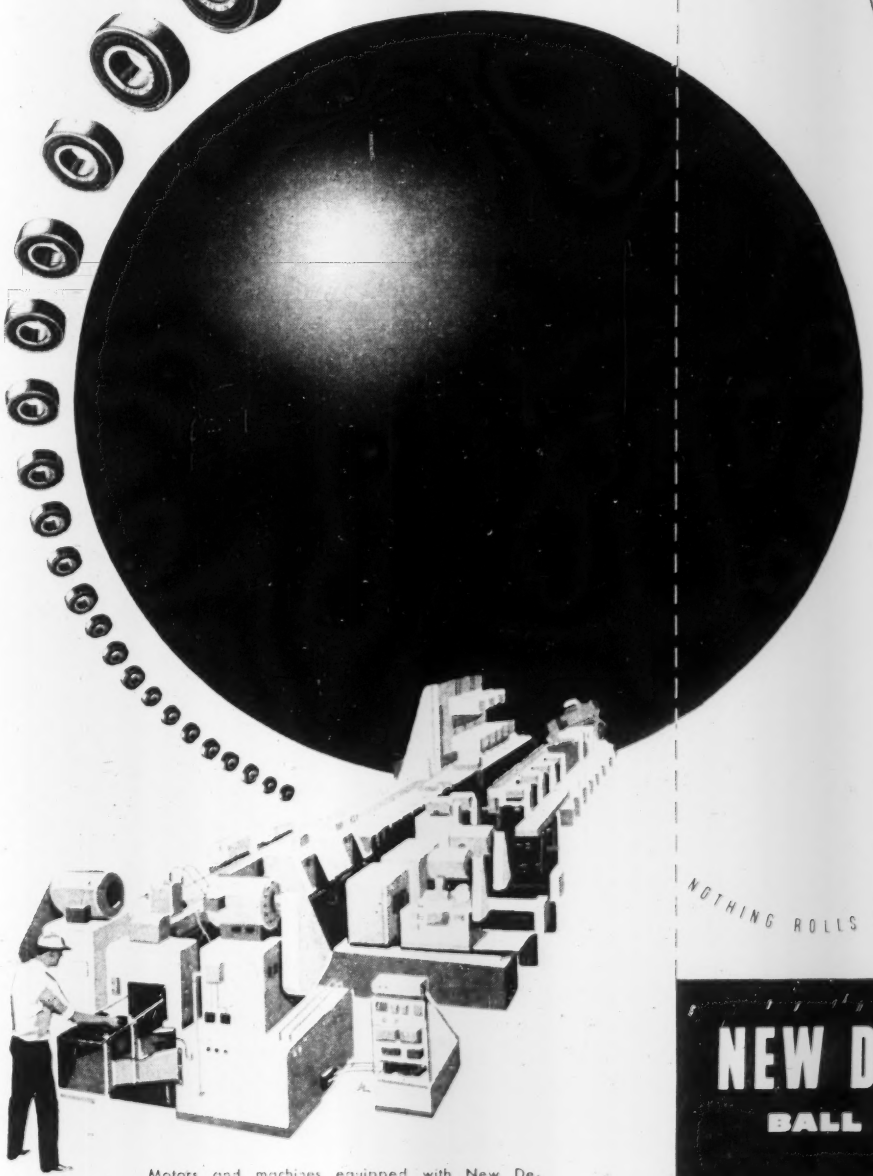
Exhaust Notes

Ford sold 103,399 passenger cars last month, largest November sales for the firm since 1925 . . . Chrysler announces a $21-million expansion in addition to a $20-million program now under way which will more than double capacity of its Windsor, Ont., engine plant by December, 1954 . . . PowerFlite automatic transmissions are being produced at the rate of 2400 units per day, says R. S. Bright in the first announcement of production figures. Over 125,000 units have already been produced at the Chrysler Corp. Indianapolis plant.

AUTO WITH THE HOLE ON TOP
. . . for Mercury riders things are looking up

SEALED-FOR-LIFE NEW DEPARTURES





Motors and machines equipped with New Departure Sealed ball bearings operate longer at peak efficiency with virtually no maintenance costs!

Automatically Service-Free!

Compact design . . . minimum maintenance costs . . . accurate alignment . . . smooth, dependable performance . . . these are just a few of the many advantages made possible by New Departure Self-Sealed ball bearings. No wonder so many motor and machinery manufacturers are already using N-D Seal bearings. In fact, since New Departure first introduced the N-D Seal, more than 255 million have been used in hundreds of applications throughout industry.

Why not call in a New Departure engineer and find out what N-D Seals can do for *your* product?

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio

"16-25-6"*

...used in more jet engine rotor wheels than all other alloys combined!

WAR baby of the Timken Company, "16-25-6" alloy steel helped make jet propulsion practical because it was the *one* steel suitable for commercial production of jet engine rotor wheels. More of it has been used for this purpose than all other alloy steels combined! Reason: it has the *best* combination of the three top requirements for jet engine rotors.

1. GOOD HIGH TEMPERATURE PROPERTIES! Operating in gas temperatures up to 1500° F., "16-25-6" retains high creep and stress rupture strength. And it has excellent resistance to scale and corrosion.

2. LOW IN STRATEGIC ALLOYS! "16-25-6" uses no cobalt or columbium, is relatively low in other strategic alloys.

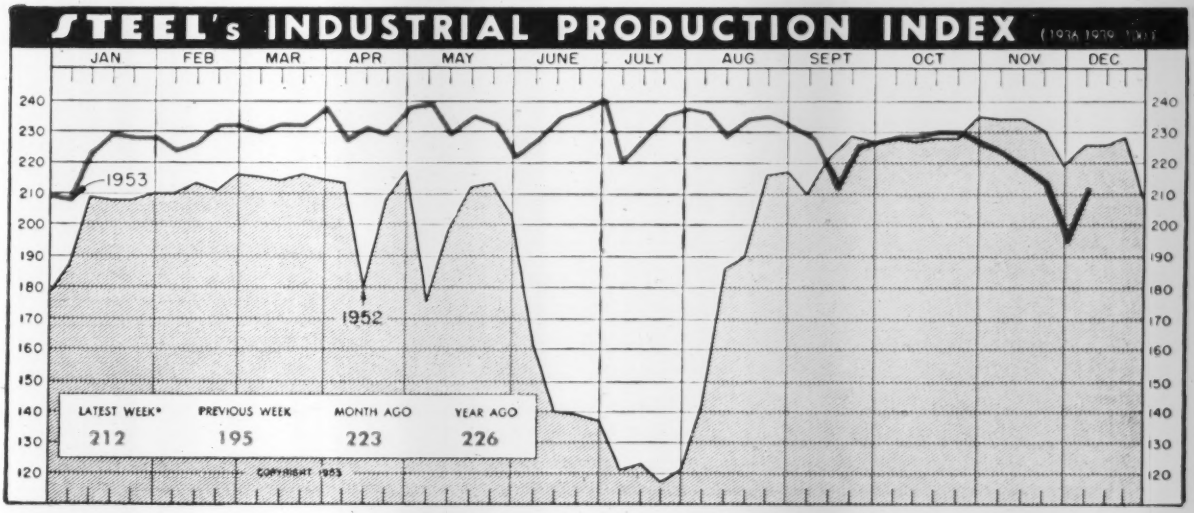
3. GOOD MACHINABILITY!

The Timken Company will help you adapt "16-25-6" to your purposes—or help you choose other alloy steels suited to today's high temperature, high speed applications. Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

* Reg. U. S. Pat. Off.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Dec. 5

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%.

Business Bounces Back from Holiday Lull

FORTIFIED WITH VITAMINS "A" for automobiles and "E" for electrical energy, STEEL's industrial production index showed a remarkable recovery from its holiday lethargy during the week ended Dec. 5 and recuperated to an estimated 212 per cent of the 1936-1939 average. That was a recovery of 17 points from the adjusted figure of 195 the preceding week and came within one point of reaching the level of two weeks ago. Compared with a year ago the same time, the index still is weak and could stand a dose of the iron compound, steel.

More Autos Make Difference . . .

Big wheel in the rebound of industrial activity is the automotive industry. And it looks like the index may hinge on production in Detroit for some time to come. *Ward's Automotive Reports* reveals that for the week ended Dec. 5, U. S. and Canadian motordom put out 124,659 trucks and passenger cars, about 50,000 units above the previous week and only about 650 shy of the same week a year ago. Auto production exceeded that of a year ago, but truck turnout in both countries lagged behind the similar week of 1952.

All eyes will be turned on Detroit as the new year rolls around. Ford and Chevrolet are girding for the perennial battle for first place in sales. In Hollywood, Fla., Ernie R. Breech, executive vice president of Ford, told the annual meeting of Investment Bankers Association of America that his company is "rapidly nearing the manufacturing capacity of our chief competitor and our costs are increasingly favorable."

On the other hand, W. E. Fish, manager of GM's Chevrolet Division, predicted more Chevrolet cars will be produced in first quarter of 1954 than in first quarter, 1953. He added, "We have no intention of giving up first place to anyone."

Third-Quarter Changeovers? . . .

Another indication that Detroit thinking is running in lines of another boom year, reports *Ward's*, is that some producers are prepared to return to the third-quarter introduction of new models if 1954 sales lag.

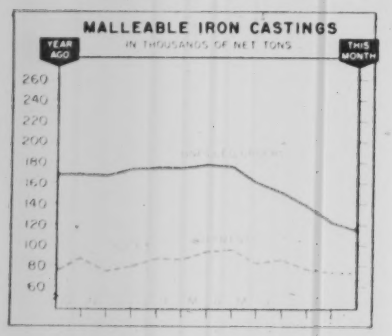
Meanwhile, dealers are still looking for some way to reduce their new-car stocks, which continue at above normal levels. The reduction in production through November had not shown up in dealers' yards by Nov. 20, *Ward's* says. Sales from Nov. 1-20 were about 10 per cent below the rate of deliveries in the preceding 20 days, and with the return to higher production levels there seems to be no answer to the problem except unusually hard selling.

Electric Energy Comes Back . . .

The second strongest factor in STEEL's industrial production index—electrical energy—showed a return to normalcy and accounted for 3 points of the current rise with an estimated distribution of 8.4 billion kilowatt-hours of power. That is an expected gain over the 8,138,165,000 kilowatt-hours distributed during Thanksgiving week, reports Edison Electric Institute. Electric power output continues to run ahead of 1952 figures by about 6 per cent.

Steel Fails To Respond . . .

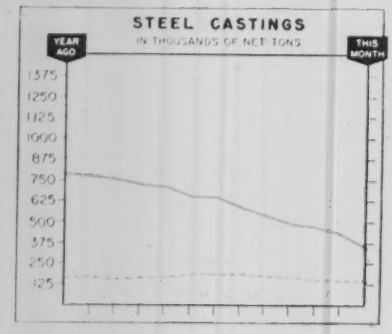
Loading of railroad revenue freight for the week ended Dec. 5



Malleable Iron Castings
Thousands of Net Tons

	Shipments 1953	Shipments 1952	Unfilled Orders* 1953	Unfilled Orders* 1952
Jan	87.2	87.0	174.8	208.0
Feb	86.3	82.9	176.1	193.1
Mar	94.5	81.0	177.8	186.9
Apr	89.9	86.3	173.5	185.2
May	82.1	81.8	160.1	180.1
June	86.5	74.4	151.0	173.1
July	77.1	45.5	137.3	166.6
Aug	73.9	63.7	120.8	162.7
Sept	74.3	75.9	113.5	165.8
Oct		88.1		165.9
Nov		76.1		167.8
Dec		80.6		173.5
Total		926.1		

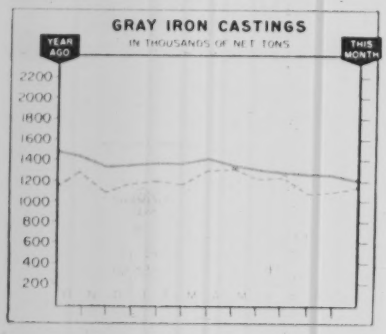
*For sale: U. S. Bureau of the Census



Steel Castings
Thousands of Net Tons

	Shipments 1953	Shipments 1952	Unfilled Orders* 1953	Unfilled Orders* 1952
Jan	197.2	193.7	706.3	806.3
Feb	175.7	174.6	644.3	806.9
Mar	182.2	173.7	631.6	807.1
Apr	179.6	175.1	573.6	813.0
May	165.6	173.6	525.0	801.7
June	161.7	141.6	476.8	816.6
July	139.6	119.0	467.9	852.0
Aug	141.3	150.2	418.8	805.1
Sept	131.7	158.1	327.2	781.9
Oct		165.2		772.9
Nov		148.3		751.7
Dec		161.7		739.2
Total		1,925.1		

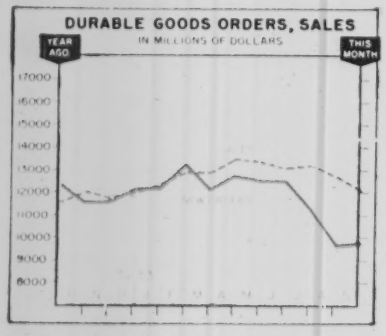
*For sale: U. S. Bureau of the Census



Gray Iron Castings
Thousands of Net Tons

	Shipments 1953	Shipments 1952	Unfilled Orders* 1953	Unfilled Orders* 1952
Jan	1,162	1,399	1,333	1,801
Feb	1,136	1,155	1,332	1,766
Mar	1,264	1,372	1,376	1,711
Apr	1,277	1,205	1,396	1,614
May	1,156	1,101	1,272	1,456
June	1,196	834	1,216	1,145
July	1,056	636	1,233	1,110
Aug	1,069	1,002	1,223	1,211
Sept	1,103	1,119	1,170	1,151
Oct		1,233		1,192
Nov		1,061		1,305
Dec		1,142		1,316
Total		13,666		

*For sale: U. S. Bureau of the Census



Durable Goods Orders, Sales
In Millions of Dollars*

	New Orders 1953	New Orders 1952	Sales 1953	Sales 1952
Jan	12,080	11,342	12,156	10,861
Feb	13,138	11,519	12,528	11,352
Mar	12,023	12,171	12,521	10,632
Apr	12,621	12,443	13,490	11,316
May	12,444	10,956	13,238	11,328
June	12,456	13,138	10,016	10,060
July	11,078	11,110	13,141	9,777
Aug	9,541	9,908	12,615	10,437
Sept	9,950	12,328	12,015	11,510
Oct		11,452		11,968
Nov		11,111		11,626
Dec		12,011		11,503

*Seasonally adjusted: U. S. Bureau of Business Economics

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Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Nov. 30	Indus. Production	Nov. 23	Ranges, Gas	Oct. 12
Employ., Metalwk.	Nov. 30	Ironers	Nov. 23	Refrigerators	Nov. 2
Employ., Steel	Nov. 30	Machine Tools	Dec. 7	Steel Forgings	Dec. 7
Exp. Strtg. Steel	Nov. 16	Prices, Consumer	Dec. 7	Steel Shipments	Oct. 12
Foundry Equip.	Nov. 16	Prices, Wholesale	Nov. 30	Vacuum Cleaners	Oct. 12
Freight Cars	Nov. 23	Pumps	Nov. 16	Wages, Metalwk.	Nov. 9
Furnaces, Indus.	Dec. 7	Radio, TV	Nov. 23	Washers	Nov. 9
Gears	Nov. 16	Ranges, Elec.	Nov. 2	Water Heaters	Nov. 9

is expected to recoup some of the losses over Thanksgiving, which further bolsters the industrial production index. All of which leaves us with steel as the only element of the index which failed to respond after the holiday.

American Iron & Steel Institute reports that steel operations for the week ended Dec. 5 were at the rate of 87.5 per cent of capacity, or 1,972,000 tons of ingots and steel for castings. Production last week was expected to slip off to 85.8 per cent of capacity, which would mean only 1,943,000 tons of steel. AISI reports that some January production estimates are being lowered because consumers are not working off their steel inventories as rapidly as had been anticipated. However, there should be a pickup later in first quarter.

Deliveries Fast in Chicago . . .

Other spot checks in the nation's economy show similar signs of easing off toward year end. Purchasing Agents Association of Chicago, in the November revort of its Business Survey Committee, says last month was the first month in which there was no report of slower deliveries. Faster deliveries have inspired plants to reduce inventories. The survey also showed lower levels of employment than in October and less overtime. However, those surveyed told the association that their production was remaining near pre-November levels, even though there were fewer employees. PAAC reports that 60 per cent of reporting members again had lower backlog of orders than in the month previous.

Of particular interest in the report was the fact that, granting volume of business during the first six months of 1954 remains fairly close to 1953, 84 per cent of the purchasing agents answering believed elimination of the excess profits tax would benefit their companies. Fifty-three per cent of those said the additional revenue would go for working capital; 44 per cent said plant expenditures; and 20 per cent said dividends.

Employment Picture Good . . .

In line with the reduced pace of business, the Department of

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	87.0	87.5	105.5
Electric Power Distributed (million kwhr)	8,582	8,138	8,165
Bitum. Coal Output (daily av. 1000 tons)	1,233	1,475	1,512
Petroleum Production (daily av. 1000 bbls)	6,230[1]	6,227	6,477
Construction Volume (ENR millions)	$294.4	$145.1	$344.2
Automobile, Truck Output (Ward's units)	124,659	74,290	129,005
TRADE			
Freight Car Loadings (unit 1000 cars)	625[1]	596	719
Business Failures (Dun & Bradstreet, no.)	190[1]	173	120
Currency in Circulation (millions)[3]	$30,791	$30,691	$30,274
Dept. Store Sales (changes from year ago)[4]	4%	2%	1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$16,956	$18,636	$16,819
Federal Gross Debt (billions)	n.a.	$275.1	$259.5
Bond Volume, NYSE (millions)	$15.5	$11.5	$21.6
Stocks Sales, NYSE (thousands of shares)	8,525	6,028	8,100
Loans and Investments (billions)[1]	$80.4	$80.5	$78.5
U. S. Gov't Obligations Held (billions)[1]	$32.7	$32.6	$33.0
PRICES			
STEEL's Finished Steel Price Index[5]	189.74	189.91	181.31
STEEL's Nonferrous Metal Price Index[6]	204.8	206.7	213.2
All Commodities[7]	110.2	110.0	109.7
Commodities Other Than Farm & Foods[7]	114.6	114.6	113.1

[1]Dates on request. [2]Preliminary. [3]Weekly capacities, net tons: 1953, 2,254,450; 1952, 2,077,010. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939 = 100. [6]1936-1939 = 100. [7]Bureau of Labor Statistics Index, 1947-1949 = 100. n.a. = not available.

Commerce reports that unemployment for November rose for the first time in some months, with 1,438,000 of the working force out of jobs. However, that is as low as in any peacetime November on record. Nonfarm employment, at 55.2 million, stood at a new high for the month.

Personal Income Rises . . .

With more people working, it is not surprising that personal income is setting a high pace. October income rate of $287 billion was $10 billion higher than during a year ago, the Commerce department reports. The first ten months of 1953 maintained a record pace of $284.5 billion, nearly $17 billion above the comparable period last year.

Consumer Credit Marches On . . .

As America's personal income went up, so did its consumer credit. Installment credit on Oct. 31 stood at $21,486 million, $139 million above the previous month. Automobile paper accounted for $105 million of the increase, a result of the late season push to reduce dealers' stocks before the advent of new models.

Department Store Sales Down . . .

The prosperity of the American people is not being felt by retail dealers as much as they would like. For the week ended Nov. 28, department stores reported to the Federal Reserve Board that dollar volume of sales was down 4 per cent from year-ago levels, the second consecutive week they have reported a negative figure. However, the Jan. 1-Nov. 28 level of sales is still 2 per cent above the similar period in 1952. With one more shopping day before Christmas this year than last, merchants are hoping to end up with sales at least equivalent to 1952, however.

Trends Fore and Aft . . .

"Railroad equipment market has been slow," says John E. Rovensky, chairman of American Car & Foundry, "especially in freight cars. But some additional passenger car orders have been booked recently." . . . Only 22 per cent of executives checked by California Manufacturers Association expect larger business volume in 1954 . . . Federal Communications Commission issued construction permits for eight more television stations.

EQUIPPED and LOCATED Right

Simonds Gears

SPUR • BEVEL • MITRE • WORMS
WORM GEARS • RACKS • PINIONS

Backed by the experience of more than 60 years of gear-making, Simonds is properly equipped to match your most exacting specifications . . . is properly located to assure prompt delivery to most industrial areas. Simonds' custom service is available for heavy-duty gears ranging up to 145" in diameter in cast or forged steel, gray iron, meehanite, bronze, rawhide and bakelite.

SIMONDS GEARS

SIMONDS also is stock carrying distributor for Ramsey Silent Chain Drives and Couplings; and industrial V-Belts.

THE SIMONDS GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.

more tons per dressing from

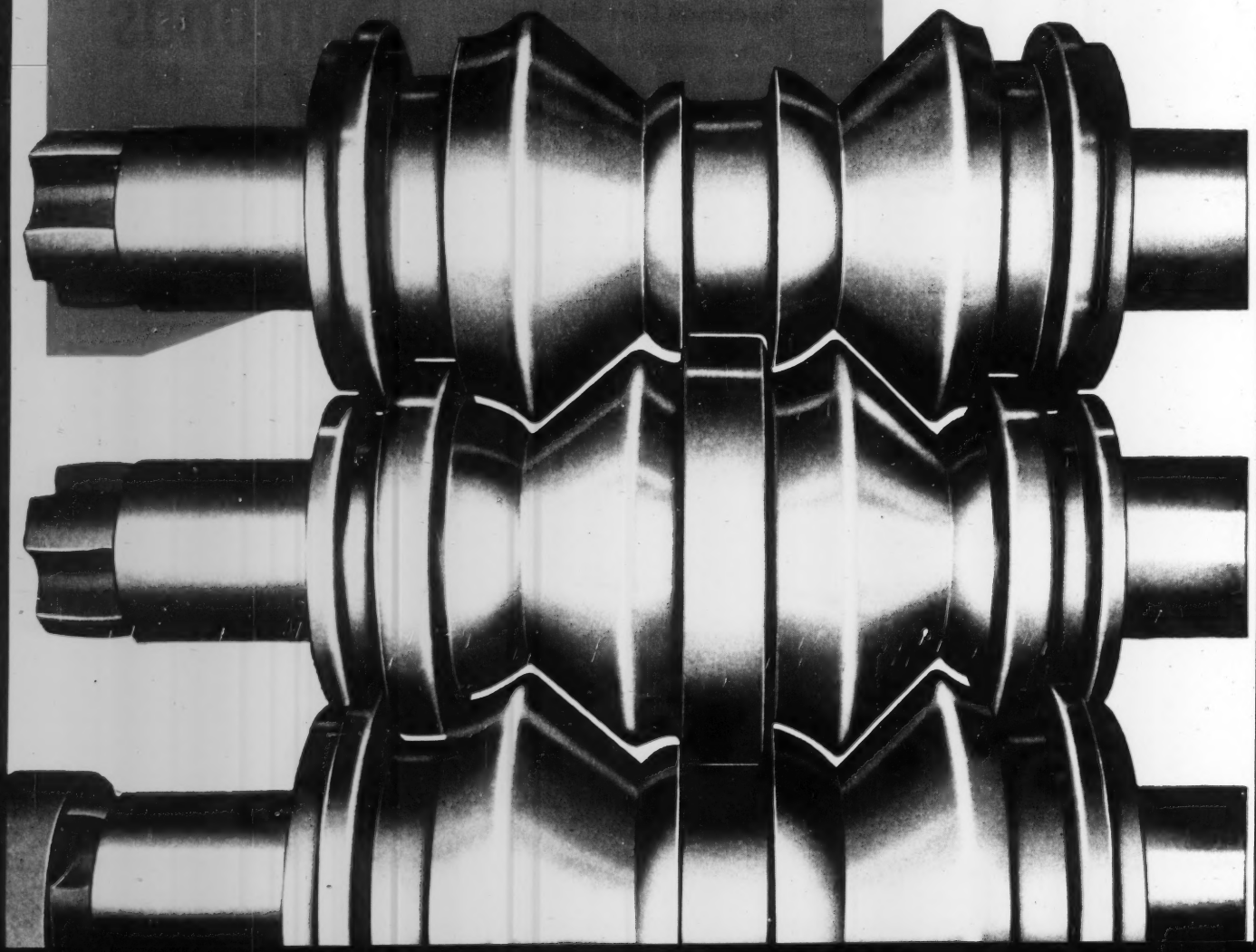
Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • PLANTS AT LIMA • AND SPRINGFIELD, OHIO

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Holl-O-Cast Rolls
Chilled Iron Rolls
Denso Iron Rolls
Nickel Grain Rolls
Special Iron Rolls
Nioloy Rolls
Flintuff Rolls
Ohio Double-Pour Rolls



MATTHEW J. BETLEY
. . . Aeroquip v. p. and gen. mgr.

EARLE A. CHANNER
. . . gen. sales mgr. at H. M. Harper

RALPH H. BEHREND
. . . H-P-M's C-Frame press sales mgr.

Matthew J. Betley was elected vice president and general manager of **Aeroquip Corp.**, Jackson, Mich. He joined the firm in 1952 and was named vice president-manufacturing last February. In his new post he is responsible for sales, engineering, financial and manufacturing functions of Aeroquip, including management of subsidiaries Aeroquip Inc., Aero-Coupling Corp. and Elbeeco Inc.

Harold G. Dickey was elected president, **Moore Drop Forging Co.**, Springfield, Mass. Previously vice president and general manager, he succeeds **John M. Collins,** now chairman of the executive board. **Carl R. Grunander,** a vice president, also will serve as general manager.

Robert K. Beck succeeds **W. A. Singer** as president of **Apex Smelting Co.**, Chicago. Mr. Singer becomes chairman of the board. Mr. Beck was formerly vice president-general manager.

Ingersoll Products Division, Borg-Warner Corp., Chicago, appointed **R. B. Crean** a vice president. He retains his title of assistant general manager of the division. **Howard A. Schmeal** becomes secretary-treasurer. Mr. Crean resigned as vice president, Eddystone Division, Baldwin-Lima-Hamilton Corp., last spring to join Ingersoll.

Earle A. Channer was made general sales manager, **H. M. Harper Co.**, Morton Grove, Ill. Associated with Harper since 1939, he became eastern district sales manager in 1951 located in New York, and the following year served in Washington with National Production Authority as an industrial specialist.

Paul B. Wishart, vice president-general manager, was elected president, **Minneapolis-Honeywell Regulator Co.**, Minneapolis. He succeeds **Harold W. Sweatt,** elected chairman of the board replacing **Mark C. Honeywell,** who was named honorary chairman.

L. J. Sorenson was elected to the newly created post of executive vice president of **Motor Products Corp.**, Detroit. He has been executive vice president of the Deepfreeze Appliance Division and its chief executive officer since 1950. Mr. Sorenson will maintain headquarters in the parent company's Detroit office as well as in north Chicago, Ill., where Deepfreeze is located.

John Schlarb is works manager and **Vern Wilson** is general foreman of the new **Pennsylvania Peerless Corp.**, Pottsville, Pa. Mr. Schlarb, who joined Peerless Production Co. in Detroit in 1948, has been serving as works manager there.

Hydraulic Press Mfg. Co., Mt. Gilead, O., appointed **Ralph H. Behrend** manager of its C-Frame press sales. Before joining H-P-M he served from 1946 to 1953 as superintendent of the tooling division at Denison Engineering Co.

Taylor-Wharton Iron & Steel Co. appointed **Richard Herold** vice president-foundry sales. He will be at High Bridge, N. J., where the company's manganese and alloy steel foundry operations are located. Further appointments include **John P. Reynolds** as sales manager for the High Bridge plant and **Joseph A. Trainor** as sales consultant to the vice president.

O. F. Sieder was elected president of **H. K. Ferguson Co.**, Cleveland, to succeed **J. B. Bonny,** now chairman of the board. **H. W. Morrison,** former chairman, continues as a director. Mr. Sieder formerly served as executive vice president and general manager. Mr. Morrison is president and Mr. Bonny a vice president and general manager of Morrison-Knudsen Co. Inc., Boise, Idaho, parent company of Ferguson.

Hunter Dietz was made manager of the newly formed Mattoon, Ill., division of **Gar Wood Industries Inc.** which will handle production of Gar Wood bulldozers and scrapers sold through Allis-Chalmers Mfg.

WALTER C. THOMPSON

RAY B. NICHOLS

. . . president and executive vice president of Torrington Co.

Co. industrial tractor distributors.

Walter C. Thompson was elected president of **Torrington Co.**, Torrington, Conn., to succeed the late **Lester J. Ross. Ray B. Nichols** succeeds Mr. Thompson as executive vice president. **N. Russell Clarke**, president of Westfield Mfg. Co., subsidiary, was elected director for the unexpired term of Mr. Ross. **Byron T. Virtue**, chief engineer of the company's bearings division, was promoted to general sales manager.

A. D. Dennis was made a special assistant to Willis G. Scholl, vice president in charge of the tractor division, **Allis-Chalmers Mfg. Co.**, Milwaukee. He was formerly general manager of the firm's Cedar Rapids, Iowa, works and is replaced there by **Wallace G. Gates**, former works manager. Both men were associated with La Plant-Choate Mfg. Co. as president and treasurer, and production manager, respectively, before its acquisition by Allis-Chalmers in 1952.

William J. Brigham was appointed district manager at Cincinnati for **Timken Roller Bearing Co.'s** steel and tube division. He has been a sales engineer in Chicago.

District representatives who have joined the sales staff of **Billings & Spencer Co.'s** forging division are: **Henry Brown** and **Paul Pfau** of Grafton, Mass., who will cover all of New England except Connecticut; **Joseph L. Glaser** of Ardmore, Pa., for eastern Philadelphia and surrounding New Jersey counties; **Peter V. Roberts**, New York, covering metropolitan New York and New Jersey; **C. J. Bennett**, Pittsburgh, assigned southwestern Pennsylvania. **Frank Cuccia Sales Co.**, Baltimore, will serve Maryland, Delaware and District of Columbia.

Joseph A. Petrick was made works manager of **Kellogg Switchboard & Supply Co.**, Chicago, a division of International Telephone & Telegraph Corp. He succeeds **James R. Brock**, resigned. **Jerry J. Zak**, shop superintendent since 1948, was named assistant works manager.

Richard G. Edwards was appointed merchandising director of **Stanley Works**, New Britain, Conn. He has been sales promotion manager, hardware division, and also manager of the magic door division.

Arvo Aho, formerly with Dayton Rubber Co., has joined **Reynolds Metals Co.**, Louisville, as sales promotion manager, building products division.

Harvey F. Smith was named sales manager of **Follansbee Steel Corp.'s** Pittsburgh warehouse.

Roy W. Scholl, formerly with Connors Steel Co., has joined **Southwest Steel Rolling Mills**, Los Angeles, as general manager.

John E. Marsh joined the sales engineering staff of **Herr Equipment Corp.**, Warren, O. With 15 years' experience in design and development of strip mill auxiliary equipment, he has been connected with Republic Steel Corp., Western Cartridge Co., Wean Engineering Co. and Arms-Franklin Co.

M. F. Judkins was placed in charge of commercial sales of zirconium and zirconium alloys for **Firth Sterling Inc.**, Pittsburgh.

Arthur A. Kappenhagen was named superintendent of **Republic Steel Corp.'s** open-hearth department at Youngstown.

Template Reproduction & Engineering Co., Philadelphia, elected **Philip E. Spindell** vice president-engineering and **Paul Mueller** vice president-manufacturing.

H. Edward Rice was appointed manager of manufacturing at **General Electric Co.'s** French road plant in Utica, N. Y. He succeeds **Wallace H. Woodlief**, transferred to the general manufacturing section of the Syracuse, N. Y., electronics division.

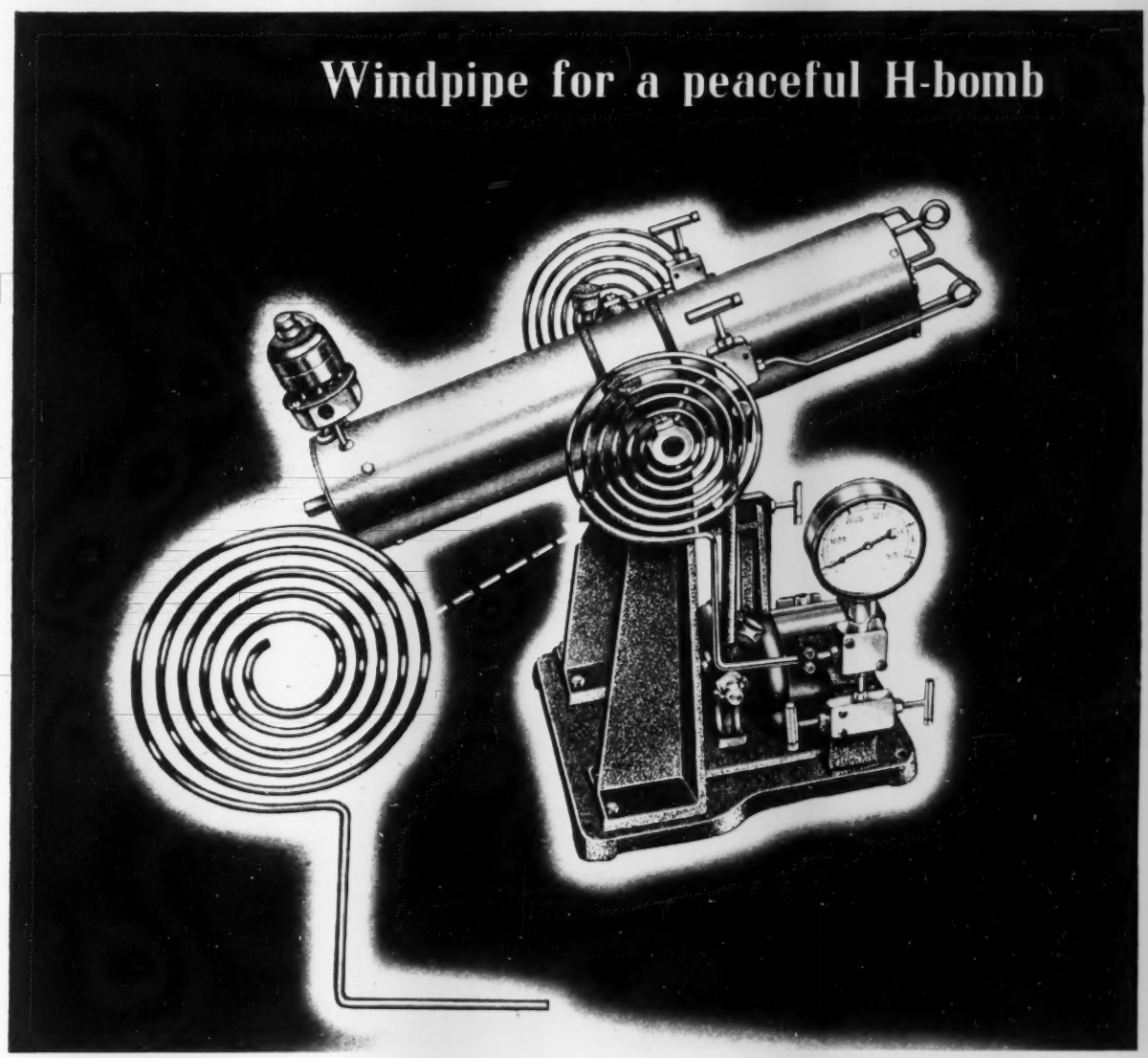
Louis W. Hesse was appointed director of industrial relations, **Keystone Steel & Wire Co.**, Peoria, Ill., and **Joseph J. Gutos** is director of community relations.

William A. Lloyd has joined the staff of **Associated Industries**, Cleveland, to handle public relations. For the last three years he has been an account executive for Nelson B. Moore & Associates and prior to that was for seven years

WILLIAM A. LLOYD

. . . joined Associated Industries

Windpipe for a peaceful H-bomb



You can call it an H-bomb if you like. Some people do. Technically, it *is* a hydrogenation bomb or, simply, a super-pressure vessel. Uses for it are legion but not warlike.

Researchers in rubber, plastics, pharmaceuticals, petroleum, and solvents pilot their hydrogenation, oxo-reaction, polymerization and other jaw-breaker problems in its gizzard—under high pressure.

To speed-up chemical reactions, the vessel is rocked 38 times a minute. Pressurizing a see-sawing chamber is in itself a neat trick: when pressures of the order of 60,000 p.s.i. are required you might become discouraged or concerned.

American Instrument Company, Inc., maker of Super-pressure equipment, introduces the pressure through a spiral windpipe. They had some trouble through tube breakage but that was before they tried Superior 304 Cold-drawn Seamless Stainless Steel Tubing. Superior gives them just the flexibility and fatigue strength needed for cyclic operation, plus chemical resistance and burst pressure to spare. Spirals of Superior 304 are easier to bend, last longer. And American Instrument reports them dimensionally uniform, smooth and free from surface imperfections.

If you haven't found small tubing in the analysis, size, and finish you want, or if you think there's little difference in tubing or tubing experience, Superior invites your inquiry. Superior Tube Company, 2005 Germantown Avenue, Norristown, Pennsylvania.

Round and Shaped Tubing available in Carbon, Alloy, and Stainless Steels; Nickel and Nickel Alloys; Titanium, Zirconium, and Beryllium Copper

Superior

THE BIG NAME IN SMALL TUBING

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. UNderhill 0-1331

All analyses .010" to ⅝" O.D.
Certain analyses (.035" max. wall) up to 1⅜" O.D.

HARRY E. MILLER
. . . mgr. of Reynolds' extrusion plant

WILLIAM O. FAXON
. . . v. p.-mfg. at Metals Disintegrating

KENNETH L. SNOVER
. . . asst. gen. mgr. of IBM plant

Cleveland district editor for *Iron Age* magazine.

Harry E. Miller was made manager of **Reynolds Metals Co.'s** aluminum extrusion plant at Grand Rapids, Mich. He succeeds the late **C. Tichy**. Mr. Miller transfers to Grand Rapids from the company's extrusion plant at Phoenix, Ariz., where he was plant superintendent.

Robert R. TerVeen assumes the duties of purchasing agent for **American Baler Co.**, Bellevue, O. He replaces **Melvin E. Askelson**, resigned to join Henger-Seltzer Co., Los Angeles.

Richard I. Kern was made western manager of **Miniature Precision Bearings Inc.** He has headquarters at the firm's new plant at Santa Barbara, Calif.

At **Metals Disintegrating Co.**, Elizabeth, N. J., **William O. Faxon** was elected vice president of manufacturing. He was works manager of the company's Harrison Abrasive Division at Manchester, N. H. **Harold E. Collins** was also elected a vice president. He will handle marketing operations in the pigments and abrasives divisions.

Robert W. Dorn joined the Pittsburgh sales staff of **L. B. Foster Co.** He was previously associated with Danforth Co., Pittsburgh Gage & Supply Co. and Industrial Equipment Corp.

Norman Rosow was elected president, **New York Brass & Copper Co. Inc.**, New York. He succeeds **Harold Lamberg**, who becomes secretary-treasurer. **George Lamberg** was made a vice president.

International Business Machines Corp. promoted **Kenneth L. Snover** to assistant general manager of its Poughkeepsie, N. Y., plant and **Joseph F. Degen** to plant superintendent. Mr. Snover has served as plant superintendent since 1951.

Waldes Kohinoor Inc., Long Island City, N. Y., named **John A. Petrie** a factory representative for its Truarc Division. Formerly assistant to **Harold F. Bower**, Truarc sales manager, he is succeeded in that post by **John C. Parry**, who before joining Waldes was with Baldwin - Duckworth Chain Division, Chain Belt Co.

Lawrence F. Schuetz was named production manager, **Interstate Drop Forge Co.**, Milwaukee. He succeeds **John H. Plischke**, named assistant superintendent.

OBITUARIES . . .

Francis J. Lapointe, 68, founder of **American Broach & Machine Co.**, Ann Arbor, Mich., and **Acme Broach Corp.**, Milan, Mich., died Nov. 27. In 1936 American Broach was merged with Sundstrand Machine Tool Corp. of Rockford, Ill., and Mr. Lapointe continued in the merged company as vice president and general manager of the Ann Arbor unit. Resigning in 1946 he moved to Lexington, Ky., where he formed Acme Broach, operations of which were moved two years later to Milan. Mr. Lapointe was active in the firm as chairman and executive vice president until his recent illness.

Arthur F. Benson, 58, vice president, **American Meter Co.**, Erie, Pa., died Nov. 30.

Samuel E. Bool, 83, former partner in **Pickands, Mather & Co.**, Cleveland, died Dec. 4. His association with the firm began in 1887 and lasted until retirement in 1942. After serving in many capacities including bookkeeper, cashier and auditor, Mr. Bool was admitted as a member of the firm in 1923. He had been a director of Penton Publishing Co. and of Great Lakes Towing Co. where he also served as chairman of the executive committee.

Hugo W. Liebert, 72, retired director of manufacturing, tractor division, **Allis-Chalmers Mfg. Co.**, Milwaukee, died Nov. 23. He retired in 1950.

Harry M. Appel, 69, Chicago district sales manager for **Danly Machine Specialties Inc.**, died Nov. 24.

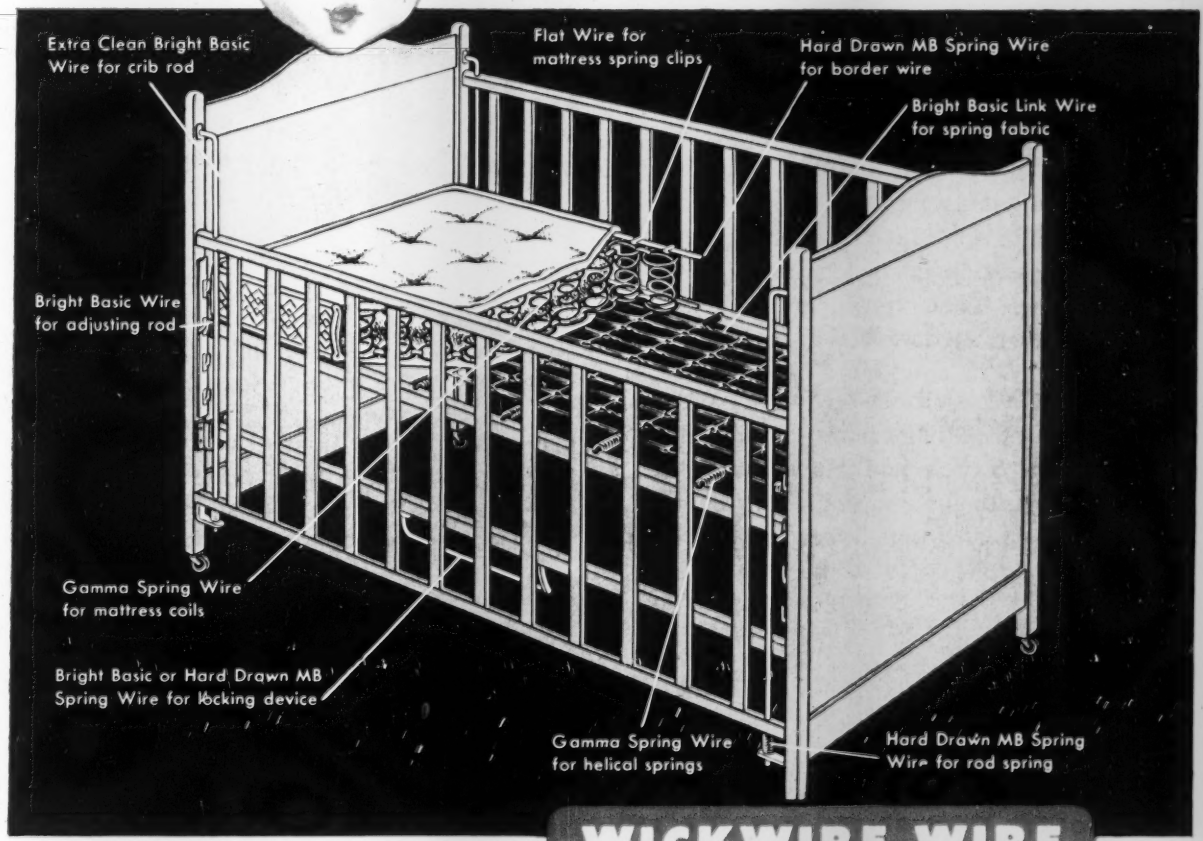
Raymond P. Scully, president, **Scully Machinery & Equipment Co.**, Chicago, died Nov. 26.

They're our babies

Here—in a baby's crib—we find just one more example of the wide diversity of Wickwire production . . . proof of Wickwire's ability to provide you with a single, dependable source of supply for every type of wire you may need in the manufacture of your particular product.

No less than nine different kinds of wire go into the making of a typical baby's crib. And every one of them is a product of Wickwire—the result of painstaking fabrication and quality control that's complete and uninterrupted from ore to finished wire.

Yes, whatever your specifications may be—high or low carbon, in all tempers, finishes and grades—
For The Wire You Require; Check First With Wickwire.


Extra Clean Bright Basic Wire for crib rod
Flat Wire for mattress spring clips
Hard Drawn MB Spring Wire for border wire
Bright Basic Link Wire for spring fabric
Bright Basic Wire for adjusting rod
Gamma Spring Wire for mattress coils
Bright Basic or Hard Drawn MB Spring Wire for locking device
Gamma Spring Wire for helical springs
Hard Drawn MB Spring Wire for rod spring

WICKWIRE WIRE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION THE COLORADO FUEL AND IRON CORPORATION

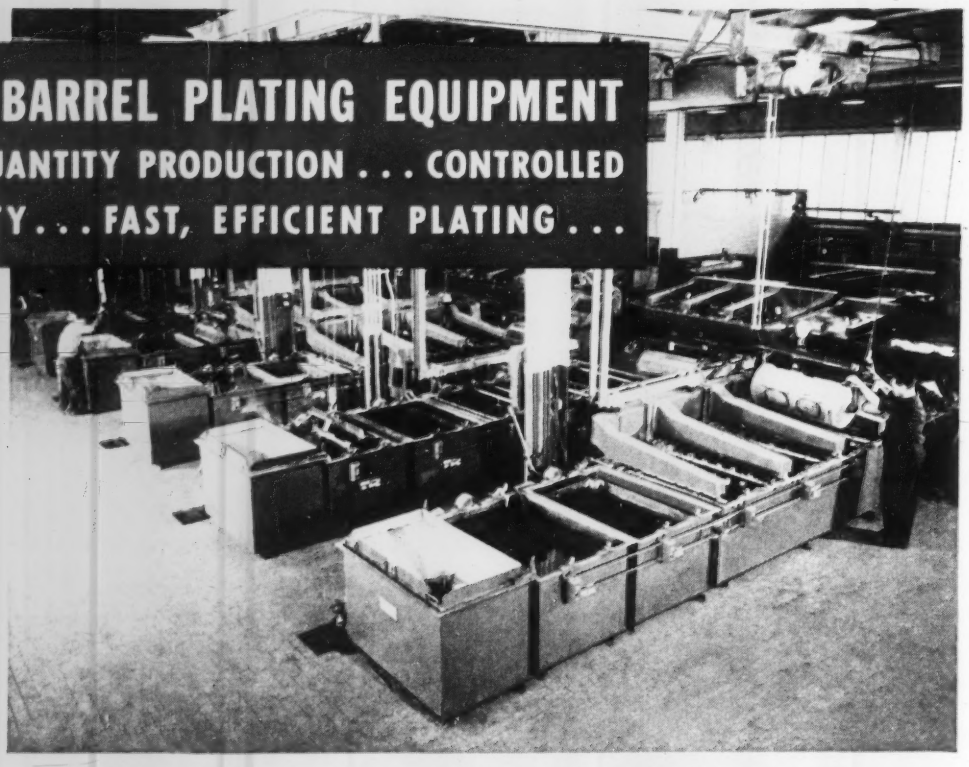
THE COLORADO FUEL AND IRON CORPORATION—Denver & Oakland
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo
Chicago • Detroit • New Orleans • New York • Philadelphia

1988

UDYLITE BARREL PLATING EQUIPMENT

ASSURES QUANTITY PRODUCTION . . . CONTROLLED UNIFORMITY . . . FAST, EFFICIENT PLATING . . .

at UNION SWITCH AND SIGNAL



Udylite Barrel-Plating Installation at Union Switch and Signal, Swissvale, Pa.

One of the most modern and streamlined electroplating plants in the United States . . . Union Switch and Signal, Swissvale, Pa., a division of Westinghouse Air Brake Company . . . uses barrel-plating equipment by Udylite. With this equipment, they know they'll get the plating results they're after!

Here's what Mr. Albert Beswick, Works Manager, says of Udylite barrel-plating equipment: "Union Switch and Signal and other divisions of Westinghouse Air Brake Company use millions of plated nuts, washers and screws annually. For large-volume handling of these tiny parts, we have found Udylite's barrel-plating equipment to be invaluable from the standpoint of economy and maintenance."

Why not let Udylite help you with your small parts plating problem. Whether it's a single barrel or a multi-barrel installation, Udylite has equipment tailored to your needs!

Call your Udylite Technical Man today or write direct. THE UDYLITE CORPORATION, DETROIT, MICHIGAN. *West of Rockies: L. H. Butcher Company, Los Angeles, California.*

PIONEER OF A BETTER WAY IN PLATING

THE *Udylite* CORPORATION
DETROIT 11, MICHIGAN

Borolite Corp. Formed

Firm will engage in research and development programs for atomic age materials

FIRTH STERLING INC., Pittsburgh, American Electro Metal Corp., Yonkers, N. Y., and Carborundum Co., Niagara Falls, N. Y., have united forces to expand activities of Borolite Corp., Niagara Falls. This latter company was formed recently to pursue research and development of various metal borides (borolites) for high-temperature military and civilian applications.

American Electro Metal Corp. assigned to Borolite Corp. all patents, compositions, processes and techniques relating to borolite materials and will provide research and some pilot plant production for the new company. Carborundum Co. will draw upon its experience with abrasive, refractory and powdered materials to produce and manufacture various borides. Firth Sterling Inc. has production know-how and equipment for certain powder metallurgy processes and will fabricate borolite products.

Borides, carbides and aluminides, all part of Borolite Corp.'s program, show promise of withstanding operating temperatures ranging from 1600 F to 2000 F for turbojets and up to 7000 F for rocket nozzles and intermediate applications.

Chicago Tramrail To Expand

Chicago Tramrail Corp., Chicago, plans to build a plant at Kostner and 14th street, that city. The plant will contain 12,000 sq ft.

Extrusion Plant Opened

Mississippi Aluminum Corp. has started operations at its plant in Gulfport, Miss., where aluminum tubing and other extrusions are being produced for the light metals trade. In February, the company will transfer operations from temporary quarters in an airplane hangar to a new 61,000-sq-ft plant. Equipment includes a 125-ton and a 3000-ton hydropress. President of the new company is William A. Engel, former executive of Bohn Aluminum & Brass Corp., Detroit, and sole owner of Oro Mfg. Co., Adrian, Mich. V. C. Mrowca is executive vice president and general manager.

Regulator Firm Names Agent

Electric Regulator Corp., Norwalk, Conn., appointed Mechron Engineering Products Ltd., Ottawa, Ont., as its sales and engineering representative in Canada. The company manufactures a voltage, current and speed regulator.

Cleveland Firm Gets Franchise

Cleveland Welding Co., Cleveland, bicycle-manufacturing subsidiary of American Machine & Foundry Co., New York, acquired the franchise for distribution of Hercules lightweight bicycles in the United States through purchase of Bicycle Sales Corp. The Hercules bicycle is manufactured by Hercules Cycle & Motor Co. Ltd., Birmingham, England.

Farrell-Cheek Names Agents

Farrell-Cheek Steel Co., Sandusky, O., appointed as its representatives Hunley A. Slaughter, Memphis, Tenn., and R. C. Brown Co., Dallas.

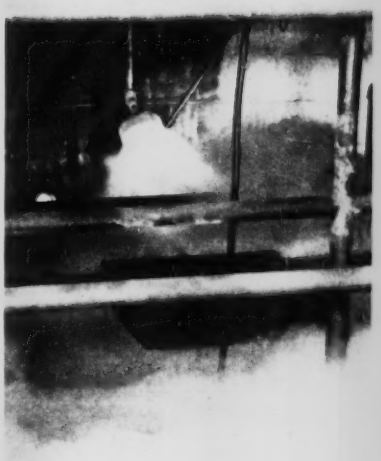
Airex Doubles Plant Capacity

Airex Rubber Co., Portland, Conn., completed an addition to its building which doubles its former facilities. The increased space will be devoted primarily to new lathes and grinding equipment used in the company's production of special rubber-covered metal rolls for applications requiring high accuracy and bonding strength. The new section also will house part of the company's expanded rubber-to-metal bonding and subassembly departments and additional laboratory facilities for performance and physical testing of molded rubber parts.

Crucible To Move Warehouse

Crucible Steel Co. of America, New York, will occupy a new warehouse and office building at 2501 Elmwood Ave., Buffalo, which will more than double the size of present facilities at 39 Carroll St. The structure will represent an investment of more than $200,000.

Charles J. Glassman, branch manager, said operations are expected to begin in the new location about next March. There will be more than 10,000 sq ft of warehouse space in the new structure.



Puff! There Goes Fire

Fire-conscious representatives of many metalworking companies attended insurance approval tests of fire protection equipment at Empire Steel Co., Mansfield, O. Automatic Sprinkler Corp. equipment, shown above, is discharging CO_2 into an oil pit. The gas also protects motors and generators

Lubricating Engineers Move

American Society of Lubrication Engineers moved its offices to 84 E. Randolph St., Chicago.

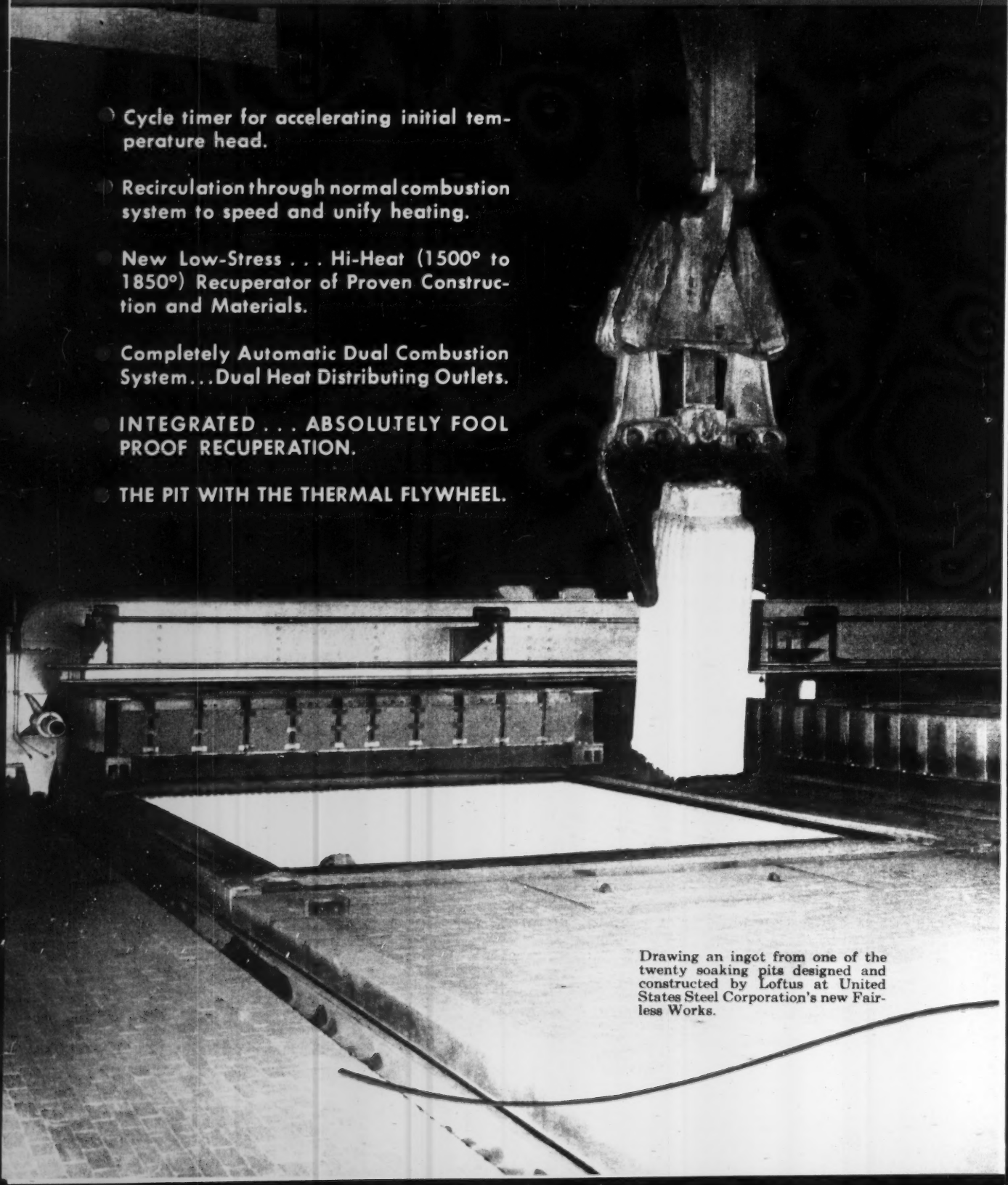
Admiral Completes Expansion

Additional construction at the Galesburg, Ill., plant of Admiral Corp., Chicago, is virtually complete. Facilities of this range-refrigerator-freezer plant now have a total area of 750,000 sq ft and contain nearly 6 miles of conveyors. A 35,000-sq-ft porcelain department extension has doubled the capacity of the firm's Midwest Mfg. Corp. subsidiary. Fabricating area in the range plant has been enlarged to include a press room and welding facilities. A second interplant conveyor system has been built between the porce-

(*Please Turn to Page* 108)

1954 DESIGN and

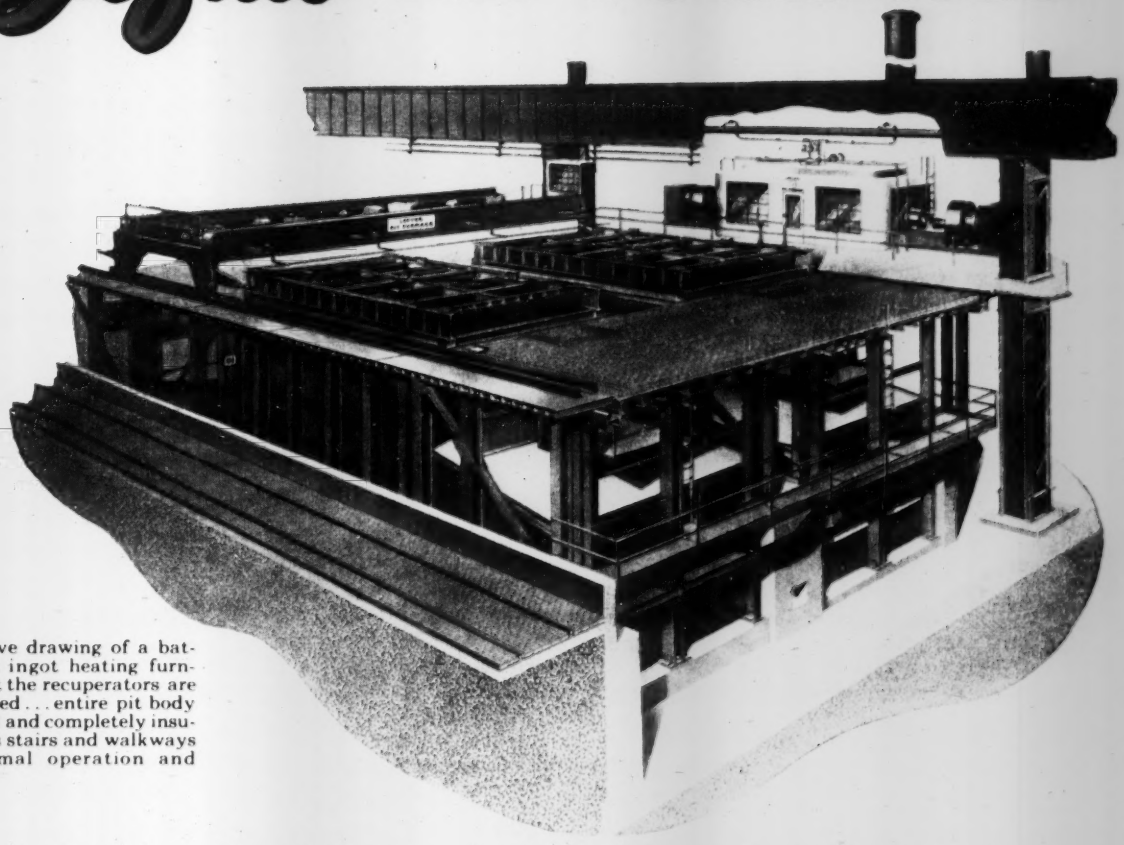
- Cycle timer for accelerating initial temperature head.
- Recirculation through normal combustion system to speed and unify heating.
- New Low-Stress . . . Hi-Heat (1500° to 1850°) Recuperator of Proven Construction and Materials.
- Completely Automatic Dual Combustion System...Dual Heat Distributing Outlets.
- INTEGRATED . . . ABSOLUTELY FOOL PROOF RECUPERATION.
- THE PIT WITH THE THERMAL FLYWHEEL.



Drawing an ingot from one of the twenty soaking pits designed and constructed by Loftus at United States Steel Corporation's new Fairless Works.

PERFORMANCE

with Loftus PIT FURNACES



True perspective drawing of a battery of Loftus ingot heating furnaces. Note that the recuperators are wholly integrated . . . entire pit body is rigidly bound and completely insulated . . . access stairs and walkways facilitate normal operation and maintenance.

The Loftus top-fired recuperative pit furnace combines all the accepted improvements in the modern ingot heating furnace PLUS new features designed to accelerate production . . . improve temperature uniformity . . . increase fuel economy . . . and reduce pit maintenance and steel conditioning costs. The improved Loftus tile recuperator reduces leakage and provides a "Thermal Flywheel" which helps return the pit to normal operating temperature in the shortest possible time after charging.

Each Loftus Pit Furnace features "Heat Acceleration" . . . synchronized to ingot charging temperature . . . to increase production; and "Flame Tempering," to prevent overheating, and to insure uniformity. Write today.

WRITE TODAY! Actual operating data on Loftus Pit Furnaces will be made available upon request. Ask for latest literature describing in detail Loftus 2-way top-fired recuperative soaking pits.

Loftus ENGINEERING CORPORATION

Designers and Builders of Industrial Furnaces

610 Smithfield Street, Pittsburgh 22, Pennsylvania

(Continued from Page 105)
lain department and the range plant. Raw steel parts are carried over the 2500-ft long conveyor, while finished parts are returned to the assembly lines. Other plant improvements and extensions have been made.

Olin To Enlarge Facilities

Olin Industries Inc., East Alton, Ill., will spend $5.5 million to expand fabricating facilities of its Metals Division. Products to be manufactured in the new facilities will require the use of aluminum and copper-base alloys.

Hamilton Heads Pipe Institute

Frank T. Hamilton was elected president of Cast Iron Soil Pipe Institute. Mr. Hamilton is president of Anniston Soil Pipe Co., Rudisill Foundry Co. and Emory Pipe & Foundry Co., all of Anniston, Ala.

Specialty Steel Developed for Dialing System

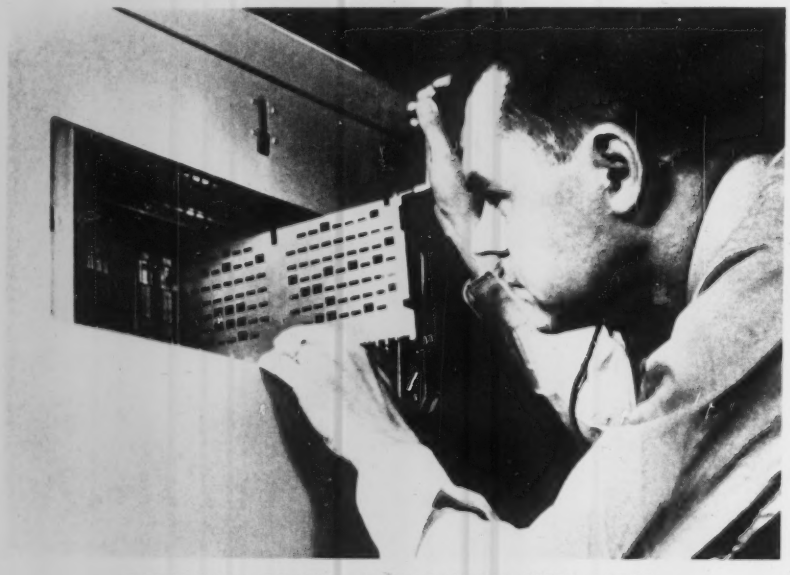
DEVELOPMENT of nationwide long distance dialing by Bell Telephone Laboratories, New York, brings new orders for specialty steel to Thomas Strip Division of Pittsburgh Steel Co., Pittsburgh.

Heart of Bell's growing network is a type of steel card file which dial systems can read. When a call arrives, cards are lifted by magnets, exposing the proper card. Its pattern of perforations is projected by light beams on a bank of phototransistors which signal switches to set up the best connection.

Tough Material Required—Early in this development Bell found there was no steel on the commercial market which met requirements of strength, long life and magnetic reaction swift enough for high speed operation. Thomas Strip Division took up the job of developing such a steel.

Today the cards are made of stiff, paper-thin high-carbon steel coated with nickel and then chrome. Coatings are applied electrolytically. Thomas rolls the steel to exacting gage tolerances steel used is about twice the diameter of a human hair. It is so light that Bell's card file, containing 1200 cards, has a card load below 100 pounds.

Potential Orders—To date Thomas has shipped tens of thousands of pounds of its new product for production into cards. Total shipments, company officials believe, amount to less than 10 per cent of the total that will be required in the next six years.



PAPER-THIN, COATED, HIGH-CARBON STEEL CARDS
. . . meet needs of strength and swift magnetic reaction

Westinghouse Plans To Build

Westinghouse Electric Corp., Pittsburgh, will build a metals development plant at Blairsville, Pa., as a major step in an expanding metallurgical program. Scheduled for completion by late 1955, the plant, which is part of the firm's $306-million expansion program, will be devoted to metallurgical development and pilot production of special alloys and special castings. The plant will provide wrought alloy and casting facilities to bridge the gap between research laboratories and ultimate commercial use of new metals and new processes. A wrought alloy department will be equipped for melting, forging, hot and cold-strip rolling and heat treating. The plant's casting department is designed to undertake a wide range of metal casting operations.

Allis-Chalmers Names Agent

General Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, appointed Leland L. Mantel as its representative in Denver and transferred Louis E. Lipphardt to its Phoenix, Ariz., district office from Boston.

R & B Tool Co. Expands

R & B Tool Co., Saline, Mich., builder of multiple spindle drilling and tapping equipment, plans to build an annex to its present plant building. The project will include additional floor space for expanded retooling operations, placing of all heavy machinery on the ground floor level and the addition of heavier crane facilities.

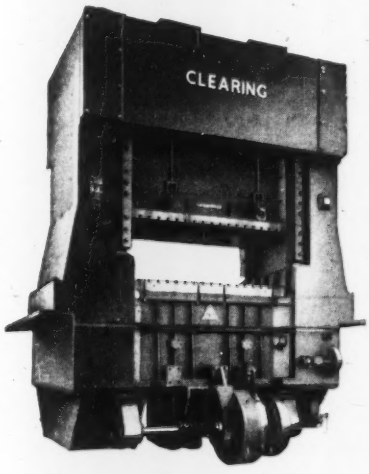
Salkover Building Plant

Salkover Metal Processing of Illinois Inc., Chicago, is erecting a $275,000 plant at Grand and 25th street, Franklin Park, Ill. The company specializes in brazing, soft soldering and bright annealing.

Interstate Establishes Branch

Interstate Steel Co., Chicago, established a branch warehouse at 185 Eaton St., St. Paul. Robert E. Walker is the district sales manager.

Does the Moon Cause Madness?



Transfiguring the landscape with its unearthly radiance, the bright light of the full moon has disturbed troubled sleepers for centuries. For this reason our ancestors, who found explanations in the natural forces for things they could not understand, blamed the moon for producing madness.

Because it's hard to dispel ideas once universally accepted, the belief in moon madness still clings in remote parts of the globe. In the same way, antiquated ideas and methods still hold on to retard progressiveness in Industry. Adhering to the slower methods of casting or cutting from solid, when parts can be produced more economically on modern Clearing presses, is a case in point.

Why not examine your manufacturing methods with an eye toward improved production using up-to-date press methods? We welcome the chance to discuss your problem with you. Get in touch with Clearing Machine Corporation, today.

CLEARING MACHINE CORPORATION

6488 WEST 65TH STREET • CHICAGO 38, ILLINOIS

HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

Worthington Builds Plant

South's first air conditioning facility will begin operations early in 1954

FIRST plant for manufacture of unit air conditioners in the South is nearing completion. The plant is being erected in Decatur, Ala., for Worthington Corp., Harrison, N. J. It represents an investment of about $3.5 million.

A mile-long network of conveyors in the 170,000-sq-ft building will be speeding 3, 5, 10 and 15-ton packaged cooling units through production early in 1954. It is now 95 per cent completed after only 123 working days.

New Techniques — Austin Co., Cleveland, is designer and builder of the plant whose pioneering use of new materials and techniques has paid off in speed as well as building value. Austin limited the use of windows in the plant to a vision strip in the one-story aluminum and brick enclosed office and personnel building.

Overhead clearance of 24 ft has been provided throughout the interior of the 640 x 240-ft production building which has an over-all height of 35 ft. Use of "free-loading" 80-ft welded H-section roof trusses with 40-ft jack trusses has yielded more than 4000 sq ft of unobstructed floor space for each of the plant's interior columns.

Maximum Freedom—The "high, wide and handsome" interior, with uniform lighting of 30 footcandles provided by semicontinuous fluorescent units at truss height, gives Worthington engineers maximum freedom in the development of mechanized production lines which will be served by a maze of overhead monorail cranes, as well as roller and power-driven conveyors at floor and bench levels.

Situated on a 135-acre tract that extends to the Tennessee river where future installation of docking facilities will provide Worthington with direct access to inland waterways, the plant has been designed for expansion to at least double its initial size. Movable tilt-up concrete panels in the 13-ft curtain wall on the river side were designed with a view to transfer and reuse in future walls whenever additional floor space is required.

Reid-Avery Names Distributor

Reid-Avery Co., Baltimore, appointed Interstate Welding Supply Corp., Cambridge, Mass., as distributor for its welding rods, wire and equipment.

Dravo Moves Branches

Dravo Corp., Pittsburgh, moved its New York city offices to 19 Rector St. The office is under the direction of Walter Barrett, district manager. Sales of marine equipment and heavy materials handling equipment are handled in the New York office by John Coakley, eastern sales manager of Dravo's Engineering Works Division.

Dravo moved its Washington office, under the supervision of J. T. Mason Jr., to 48 Court St., Ellicott City, Md. The new office, being more centrally located, will enable Dravo to serve its customers in Baltimore, Washington and the surrounding territory with greater efficiency and promptness.

Davis & Geck Builds Addition

Davis & Geck Inc., Brooklyn, N. Y., surgical specialties, is building an addition to its plant in Danbury, Conn. Estimated cost is about $4 million.

Amplex Opens Trenton Plant

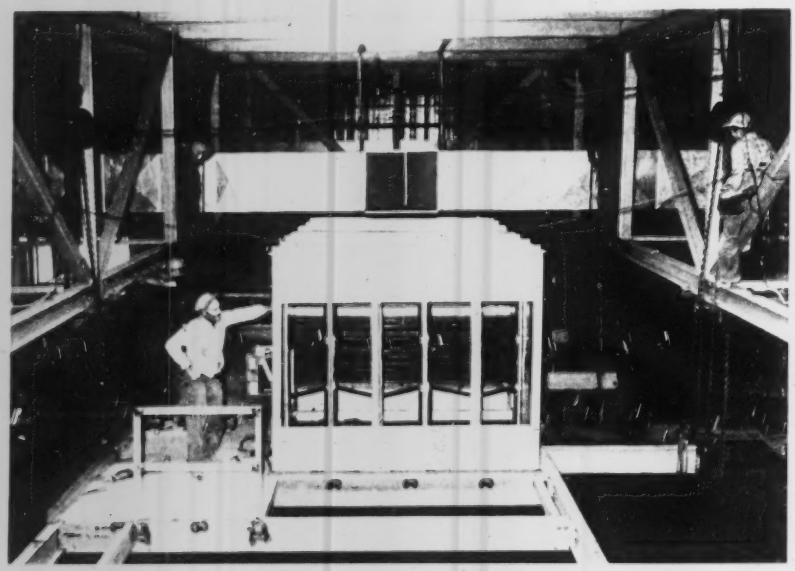
Chrysler Corp.'s Amplex Division, manufacturer of metal powder products, expanded facilities for production of Oilite self-lubricating parts. Production of Oilite parts begins this month in the division's new plant at Trenton, Mich.

National Supply Expanding

National Supply Co., Pittsburgh, manufacturer of oil field machinery and equipment, is building a plant in Gainesville, Tex. Cost of the plant and equipment, including the site, is estimated at $3.5 million.

National Radiator Buys Viking

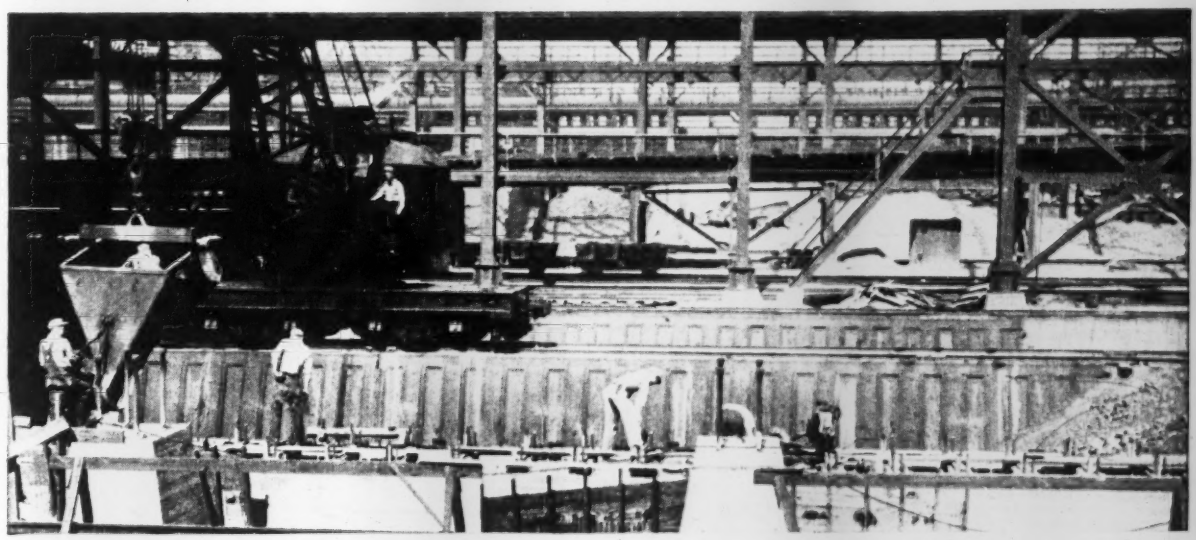
National Radiator Co., Johnstown, Pa., purchased the principal assets of Viking Air Conditioning Corp., Cleveland. Marion I. Levy, president of Viking, has been elected vice president of National Radiator and named general manager of the former Viking operations in Cleveland, which will be continued under the name of Viking Air Conditioning Division of National Radiator Co. Viking produces blowers for warm air furnaces, humidifiers, attic and window fans and recently entered the field of window-type summer air conditioning units.



SECTION OF HEATING COILS AND DISTRIBUTION DUCT
. . . is raised into position at Worthington's plant

From hot slag to heat treatment . . .

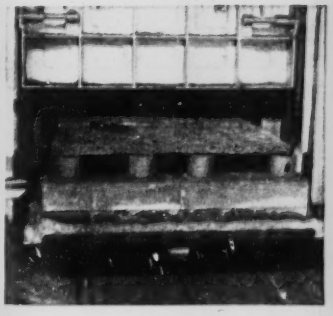
LUMNITE* saves time, cuts costs



CONSTRUCTION TIME SAVED HERE: Inland Steel Company, Indiana Harbor, Ind., made fast work of slag-pit retaining walls above. Three sets of walls, 500 feet long, resist heat in pits where hot slag is dumped and broken up with huge weights. Concrete made with Lumnite Cement is simply poured in place behind steel piling . . . *reaches service strength in 24 hours or less.* For speed, you can't beat simple monolithic concrete construction with time-saving Lumnite Cement!

OPERATING COSTS CUT HERE: Before the Attalla (Ala.) Pipe and Foundry Co. could use lift trucks for bringing scrap to cupolas, they had to build a ramp that would endure the blazing charges dropped daily by cupolas on either side. At right is their solution—heat-resistant concrete made with Lumnite calcium-aluminate cement. Tough Lumnite-made floors help cut operating costs!

MAINTENANCE REDUCED HERE: 6 months was average life of car tops exposed to quick quenching from 1700° F. at St. Louis (Mo.) Steel Casting Company. But refractory concrete car tops made with Lumnite Cement, such as the one at right, have lasted for several years. Refractory concrete has low volume change to withstand severe thermal shock; takes heat to 2600°F. Helps cut maintenance in furnace and door linings, base pads, foundations and stacks as well.



FOR CONVENIENCE, you may prefer prepared castables (Lumnite Cement plus aggregates selected for specific temperature and insulation service—add only water). They're made by refractory manufacturers and sold through their dealers. For more information, write, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

**"LUMNITE" is the registered trade mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

MP-L-71R

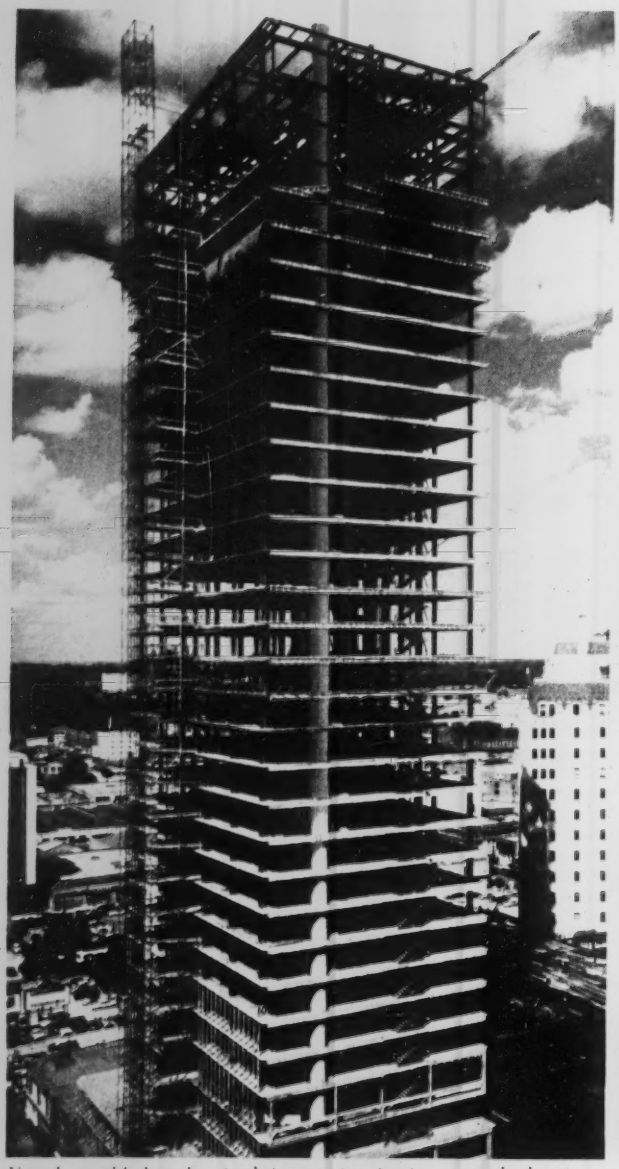
ATLAS® **LUMNITE for INDUSTRIAL CONCRETES**

REFRACTORY, INSULATING, OVERNIGHT, CORROSION-RESISTANT

A UNIVERSAL ATLAS PRODUCT

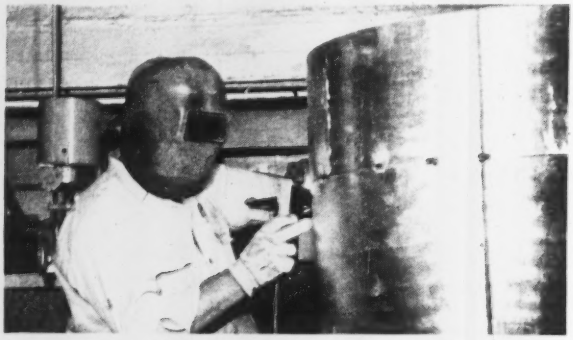
UNITED STATES STEEL HOUR—Televised alternate weeks—See your newspaper for time and station

(Advertisement)

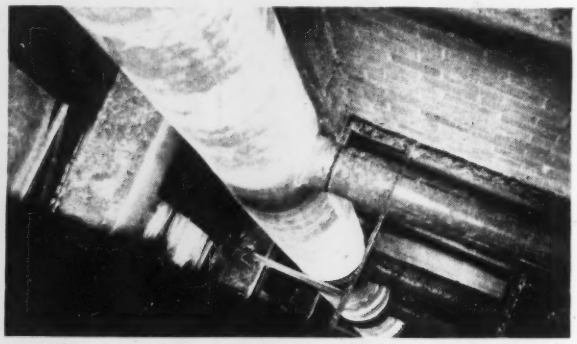


Everdur-welded, galvanized iron twin air risers supply heating-cooling air for Dallas' new Republic National Bank Building.

These Everdur-weld fabricated ducts ranged from 54 in. to 3 in. in diameter. Like duct surface, Everdur welds can't rust.



Seams were first tack-welded, then welded around the periphery, using ⅛-in. Everdur-1010 Rod and the carbon-arc method, on the 18-gage galvanized sheet-metal ducts. The welding rod was supplied by Hill Equipment and Supply Company, Dallas, Texas.



View down one of the twin air risers, showing branches to each floor. Over a mile of Everdur welds were used in this system.

If it's galvanized—weld it with EVERDUR-1010 Welding Rod

There already exists an impressive collection of evidence that for welding galvanized iron the most successful rod is Everdur 1010, the well-known ANACONDA Copper Silicon Alloy. And there's additional convincing evidence in the more than a mile of Everdur welds in the 33 floors of galvanized iron air conditioning ductwork installed in Dallas' new Republic National Bank Building.

Fabricated by the Farwell Co., Inc. of Dallas, the ducts are made of 18-gage galvanized iron and range from 54 inches to 3 inches in diameter. Twin risers run from the 3rd to the 36th floor. In the words of E. J. Bouffard, job superintendent, "carbon-arc welding with Everdur is the fastest, best and cheapest method we have found. The welds can't rust, and the heat doesn't disturb the galvanizing on the sheets."

We can tell you of many more cases where Everdur has successfully welded galvanized metals. We suggest you try it on your next job. For full information on ANACONDA Welding Rods, let us send you a copy of Publication B-13. ANACONDA Welding Rods are available from distributors throughout the United States and Canada. *The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.*

braze or weld with confidence—

ANACONDA®

welding rods

RAILROAD ROUNDUP

(*Continued from Page* 78)

that the order books are not keeping up with this goal.

The railroads expressed agreement with the goal but pointed out that attaining it by the specified time would require them to lay out an estimated $1 billion in a relatively short time. The railroads maintain that attainment of the 1,850,000-car goal is a matter of timing that the date of reaching it should be stretched out.

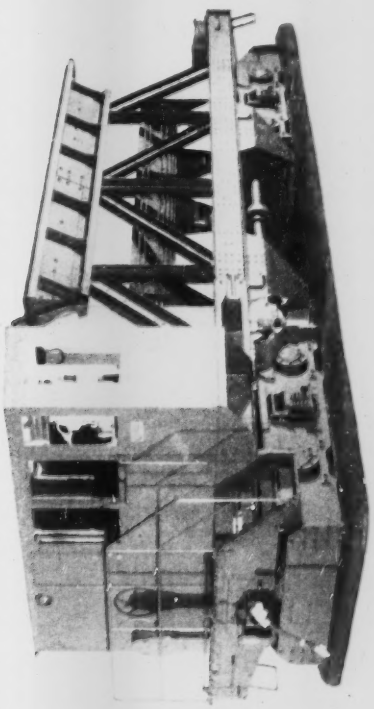
Both the DTA and the Association of American Railroads deny that the ultimate goal of 1,850,000 usable cars has been abandoned, but they indicate no compulsion will be used to make the roads progress toward that goal. Phasing out means, of course, less freight car buying. In keeping with this, the association announced no buying program at its annual meeting in Chicago Nov. 20, as is customary. Buying will slow as money diminishes or step up as it comes in.

Ordering Drops—Freight cars ordered by Class I railroads in first ten months of 1953 total 27,909, compared with 33,224 in the corresponding period of 1952. Cars on order as of Nov. 1, 1953, number 35,171, versus 90,708 cars on the same date of 1952.

Freight cars delivered in first ten months of this year aggregate 68,684. In corresponding period of 1952, deliveries totaled 63,968 cars. October, 1953, with 8727 cars delivered, was the best performance in the past two years.

Carbuilding Dilemma—Commercial freight car builders are concerned over the declining volume of freight car ordering. They claim that erratic car buying policies are making it unprofitable for them to keep their shops open. And they see another trend that threatens them with extinction. Railroads are now building 30 to 35 per cent of their new freight cars in their own shops. Formerly, the carriers constructed only some 10 per cent of their requirements. Of the 68,684 new freight cars delivered in first ten months of 1953, the carriers built 22,925, or 33.3 per cent, in their own shops. And of the 27,909 new cars ordered in the ten months of this year, 6958 cars,

(*Please Turn to Page* 116)

FOR THE VERY BEST
See ATLAS
TRANSFERS - SCALE CARS
COAL CHARGERS - COKE QUENCHERS
60-TON BOTTOM DUMP ORE TRANSFER CAR
This is one of the latest Atlas Transfer Car designs arranged for modern hydraulic operation. It provides close control of the discharge and eliminates freezing of air lines in the winter. A hydraulically operated pusher arm is provided of the latest horizontal telescoping type. The brakes also are hydraulically operated and apply automatically if pressure is low or if power fails.
At this plant the car must cross over to the coke track to shift coke cars. There is no conductor rail on the coke track so the car is equipped with a motor-driven cable reel attachment, enabling it to perform this switching function. When operating on the cable reel the collector shoes are cut out and automatically raised off of the conductor rails. The cab is overhung to give the operator a line of vision down the side of the car.

THE ATLAS CAR & MFG. CO.
ENGINEERS and MANUFACTURERS
1100 IVANHOE ROAD CLEVELAND 10, OHIO

Are you assembling 1953 (and 1954) models with Socket Set Screws of 1930 design ?

Take a look at the Socket Set Screws in many 1953 models of machine tools, plant apparatus, appliances, etc., and you'll find they are no different from those used in 1930 or before.

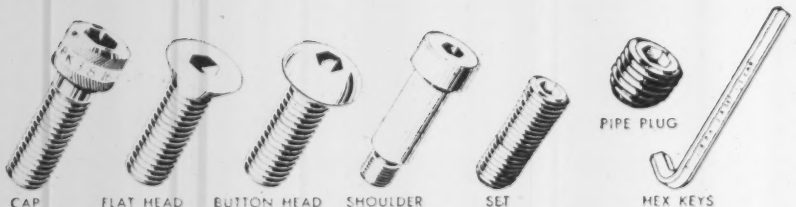
If you think there has been no change in such fasteners since 1930, you haven't seen Parker-Kalon *Ground Thread* Socket Set Screws.

Their clean, smooth, shining threads assure easy keying, and faster assembly. But equally important is the design prestige P-K Ground Thread Socket Set Screws give any product. Any buyer associates modern engineering and top most quality with a gleaming thread finish he has seen before only on costly set screws of instrument precision.

Compare them with any cut-thread socket set screws and you'll see the day- and night difference. Then specify "P-K *Ground Thread*" on your next order. Put your product out in front, assembly-wise and sales-wise.

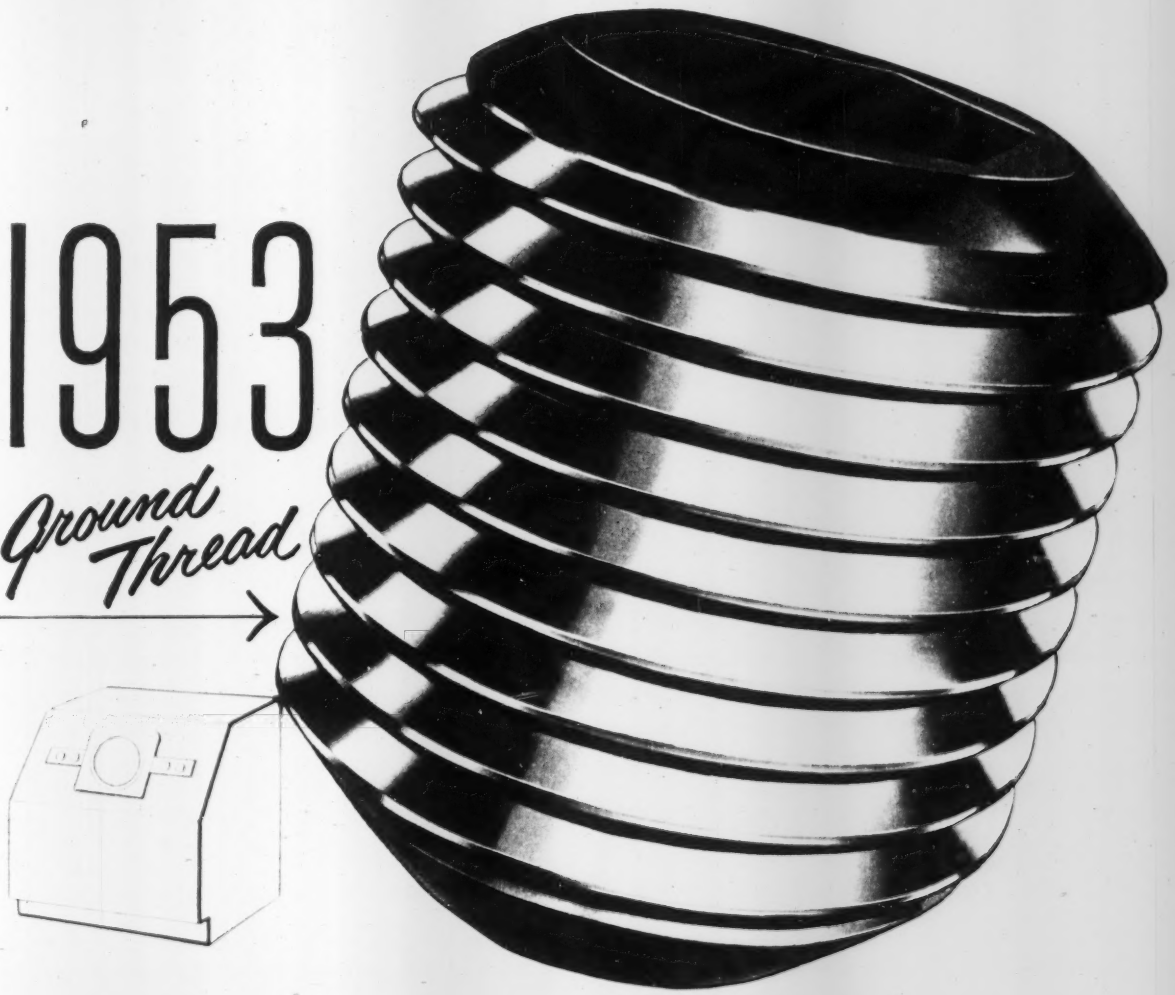
For SAMPLES, ask your P-K Distributor, or write: Parker-Kalon Division, General American Transportation Corporation, 200 Varick St., New York 14.

Good judgment calls for [redacted]



1953

Ground Thread

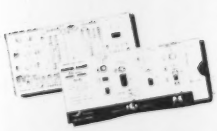


PARKER-KALON®

when good design calls for

SOCKET SCREWS

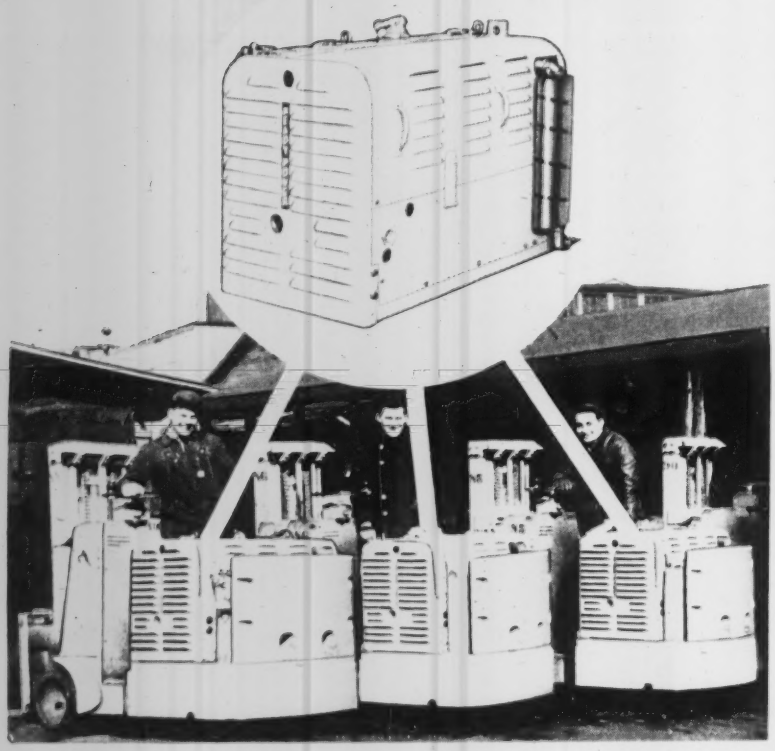
The INDUSTRIAL DISTRIBUTOR steers your Supply Dollars to the best values.



SOCKET SCREW DIMENSION FINDER

Helps you plan assemblies. Pocket-size plastic chart gives essential dimensions of all types of P-K Socket Screws. Includes Set Screw Point Dimensions, and Thread Length Formula. Available FREE from your P-K Distributor.

Ready-Power is the only Interchangeable gas-electric power unit



Interchangeable Ready-Power units allow the most simplified and economical system of preventive maintenance known, with *no truck downtime!* One spare power unit permits rotation of maintenance operations while trucks stay "on the job" . . . an important reason why Ready-Power automatic electric drive moves materials at lowest cost per ton mile!

AND CONSIDER THESE ADDED FEATURES . . .

- **ONLY READY-POWER** has a manufacturing know-how backed by more than a quarter-century of experience in building gas-electric power units.
- **ONLY READY-POWER** offers Diesel-electric power units for electric industrial truck operation.
- **ONLY READY-POWER** has a complete range of sizes in both gas-electric and Diesel-electric power units to meet the requirements of all sizes and types of electric industrial trucks.

CONTINUOUS-DUTY POWER UNITS

The READY-POWER Co.

3824 Grand River Ave., Detroit 8, Michigan

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units, Gas and Diesel-Electric Power Units for Industrial Trucks

RAILROAD ROUNDUP

(Continued from Page 113)

or 24.8 per cent, are scheduled to be built in railroad facilities.

Enigma—About 15,000, or 37 per cent, of existing passenger train cars are over 30 years old, and 26,000, or 62 per cent, of the total are over 25 years old. This suggests a large potential replacement market, but under the conditions which the railroads face, a complete or rapid replacement of passenger equipment is unlikely.

New locomotive installations in the first ten months of 1953 totaled 1839, of which 1822 were diesel-electric, 13 steam and 4 gas turbine-electric. In the same period of 1952, Class I roads installed 2667 new locomotives mostly diesels.

Statistical Picture—The carriers had 630 new locomotives on order on Nov. 1, this year, compared with 1030 on the same date in 1952. Those on order currently include 603 diesel-electric, 2 steam, 10 electric and 15 gas turbine-electric.

For some time locomotive builders have been operating at a reduced rate, and they face the same prospects for 1954. On the other hand, the locomotive parts business continues to increase. Builders believe that there is still a tremendous amount of potential locomotive business, with a foreseeable market of over 10,000 units in the United States.

Truck-Rail Union?—A development which will bear watching in the future is "piggy back" freight service. This is the hauling of truck trailer freight between major centers some distance apart by loading the trailers on flat cars. In some areas, it has been used advantageously for several years. But only recently has it attracted national attention. Several types of special flat cars and loading ramps have been developed. So far, there is no unanimity of opinion among railroads or truck operators as to its desirability or practicability.

But most of the advocates are among railroads, a sign that creative vigor still exists in an industry that has been severely restricted by high fixed costs and stringent federal controls.

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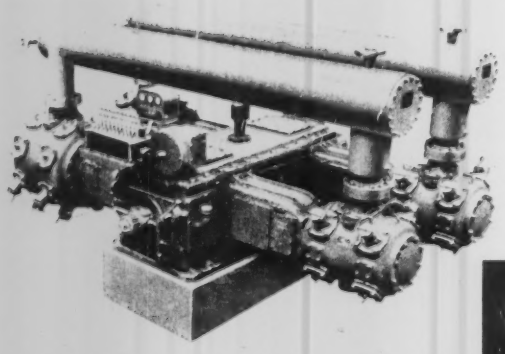
One of the biggest factors in determining the location of an air compressor is its foundation requirements. Obviously, the more a compressor vibrates, the heavier the foundation must be.

You won't face such problems with a Clark Balanced Opposed, Motor Driven Compressor. There are no vibrations . . .

They're all cancelled out!

If you'd like to install a Clark unit on an upper floor that's structurally strong enough to support its weight, *do it* . . . and you won't need much space, either. Its compact design permits installing a large amount of horsepower in a limited floor area . . . and its precision construction means you can practically forget about it once it's in operation.

For complete details on this truly modern air compressor in the 150 to 4500 hp range, write for Bulletin 118 or get the facts first hand from your nearest Clark representative.



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CLARK balanced/opposed compressors

1954 Clark Bros. Co., Division of Dresser Operations, Inc.

Technical Outlook

PLASTIC PIPE RESEARCH—Several extruders of plastic pipe and suppliers of raw materials are sponsoring research at Battelle Memorial Institute, Columbus, O. Program will develop test methods for such things as bursting strengths, safe working pressures, long-range serviceability under static pressure and dynamic loading experienced in water hammers and reciprocating pumps. This growing industry is expected to have sales in excess of $15 million this year.

COLOR IN '54— Complete line of baking enamels that harmonize with most modern interior decorating schemes will be put on the market next year by the Glidden Co., Cleveland. They were developed to color style air conditioner exteriors.

LUBRICATION— Successful production of high speed steels with internal lubrication is being hailed as a major advance in tool steels. By suitable additions to tool steel during manufacture and careful control of size and distribution of lubricating particles throughout the internal structure of the steel, it's possible to: Improve machinability and tool life, with little or no effect on bulk physical properties, heat treatment or abrasion resistance of the materials.

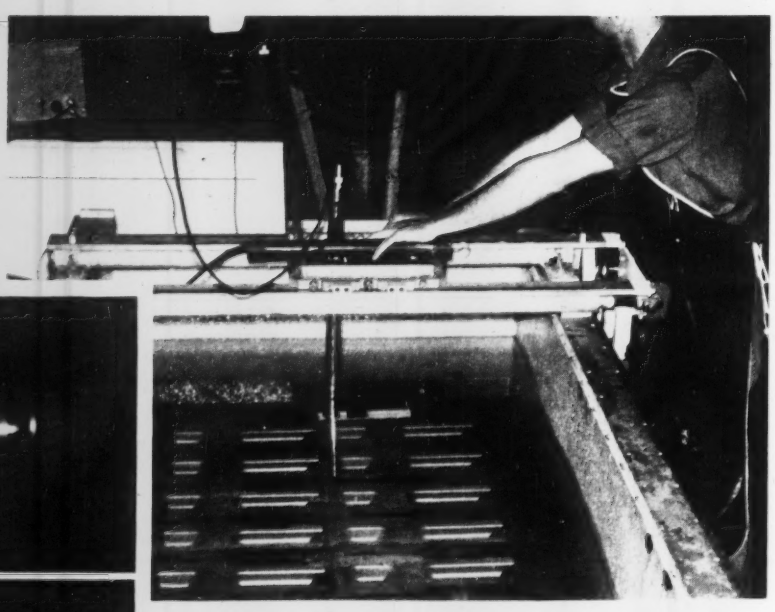
TITANIUM CUTTING: EN GARDE— Machining factors that require outstanding attention for titanium cutting are rigidity, tool sharpness and tool geometry. Professor L. V. Colwell, University of Michigan, states that while it is difficult to state exactly in a quantitative manner, it must be emphasized that setups for machining titanium require exceptional rigidity. This must include rigidity of the machine, fixture, cutting tool design and tool holders. Also, he states, it's wise to resharpen tools after less wear than ordinarily is tolerated when machining most other materials.

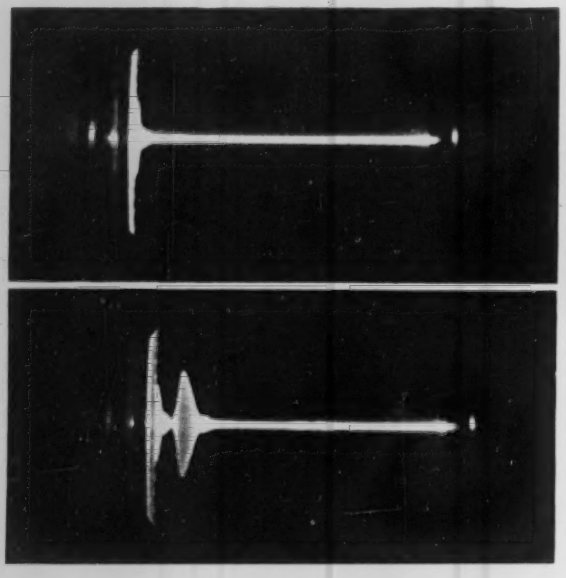
BIG FOUR— Making an ingot with a gross weight of over 672,000 pounds was one of the top problems involved in the heavy press program, Adolph O. Schaefer, vice president, Midvale Co., told the AISI in Philadelphia recently. Steel was poured from four furnaces into a gigantic mold. Composed of nickel-molybdenum steel, it was forged to a column weighing 317,000 pounds after rough machining. Dimensions after latter: 43 inches by 68 feet. After six forging operations (with long intervals between forgings for heating, removing surface defects, discarding ends, etc.), it was heat treated 475 hours.

FORMING— Look for a new American hot nut forming machine (based on a Dutch process) to be announced early next year by National Machinery Co. Machine extends hot forming of nuts into the larger sizes (up to 2 inches) in place of cold punching such sizes. Savings in materials result. Hot formed nuts from this machine have the appearance of cold formed nuts except for color.

SUPER DUPER— Oil clarifier that will hold the contents of two railroad tank cars will be installed at the Ford forge plant at Canton, O. Tank, which will be used to reclarify quench oils, is en route from the United States Hoffman Machinery Corp., Syracuse, N. Y., to Canton. Capacity is 18,000 gallons.

Receiving tank is first step toward production-type inspection. It tests forgings or several small parts. Below: Top cut shows how a good forging looks on a cathode ray tube. Bottom is a tube image of a cracked forging





Sound Waves

UNCOVER INNER FLAWS

Ultrasonic method of nondestructive testing is particularly suited for inspection of heavy sections. This company uses it in receiving department and along line

WHEN engineers at Douglas Aircraft Co. redesigned a plane for higher service ceilings, they called for thicker lucite cabin windows. This change, simple as it was, gave birth to a testing bottleneck.

To prevent scratching and damage, completed windows were covered with a spray coating. Result: Tolerances were such that measuring total thickness of the assembly was useless.

Dilemma was solved by turning to ultrasonics, a nondestructive testing technique. Testmen gaged 1436 windows (736 were already installed in aircraft) at an estimated saving of 3761 manhours.

Troubleshooter—This is typical of how Douglas exploits the versatility of ultrasonics all along the line from the receipt of materials to the finished product.

In the example, assembled windows were inspected with the Magnaflux Sonizon. By using aluminum foil between the crystal and the lucite (with oil on both sides of the foil), a satisfactory circuit and reasonably accurate measurements were obtained. Samples of known thickness were used for calibration.

Sperry Reflectoscope checked windows already installed (a special 20-foot cable allowed the instrument to remain on the ground). One man climbed a ladder and applied the crystal to the windows, while another read thickness on the instrument.

Role It Plays — Douglas relies chiefly on ultrasonics for the inspection of heavy sections, such as forgings, plates and extrusions, where high voltage requirements and other costs make x-ray prohibitive. Immersion method used eliminates much of the time formerly spent in the machining of scanning surfaces.

Excellent part for immersion scanning is a forging that ties directly to a main spar and is the means of attachment for a main landing gear. Its geometry is such that only in the thin webs are any of the opposite surfaces parallel. Because of its size and shape, it may be scarred in handling.

Quality Control—In addition to its many applications in the production line, ultrasonic inspection is a normal function in the receiving department. Forgings, extruded bars and shapes are checked to prevent questionable material from going into stock bins. If end uses warrant, plate stock is usually inspected after cutting to stock size.

Rundown on two recent orders involving 420 parts: 110 parts ac-

ceptable; 142 rejected by design engineer's standards; 168 rejected by vendor's standards. In a replacement order for 218 parts, only eight were rejected. These failed to meet design engineer's standards.

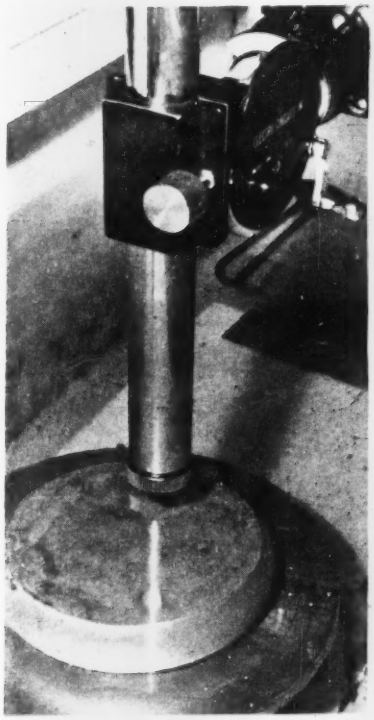
Equipment — Receiving department setup is a first step toward production-type inspection. The receiving tank (10 feet long by 40 inches wide) is large enough to take all forged shapes or a number of small parts.

Manipulator and scanner are mounted on a carriage that automatically travels the length of the tank. All controls are mounted directly on the carriage, and the crystal can be stopped at any point along the route of travel. Adjustable limit switches allow operator to use any portion of tank length.

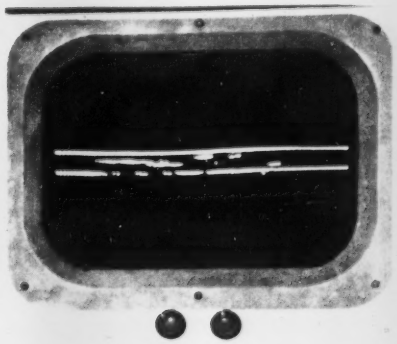
Worm gear on the carriage controls lateral travel of scanner across tank. One complete turn of screw moves scanner $\frac{1}{2}$ inch. When using crystals $\frac{3}{4}$ inch in diameter, half turn insures overlapping of sound wave. Crystal overlap is essential in all scanning to insure 100 per cent coverage.

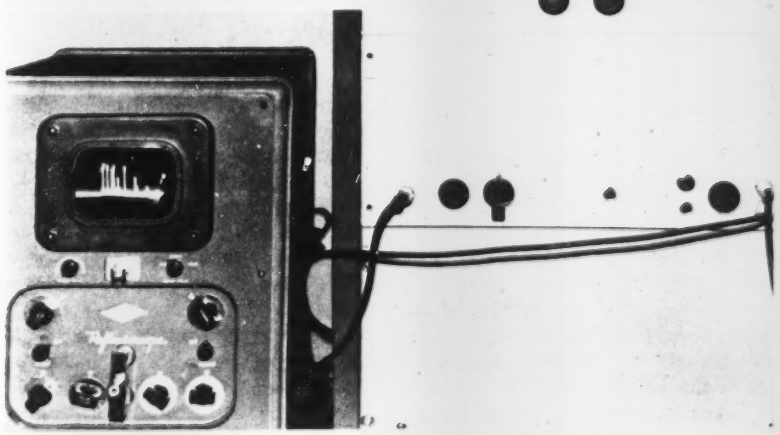
Instruments—"B" scan and wide band converter, products of Electro Circuits Co., Pasadena, Calif., and Sperry Reflectoscope are used. "B" scan is ideal for checking plate stock and symmetrical shapes. Cross-sectional photograph of the area directly below the crystal shown on a 17-inch television picture tube retains image for evaluation.

Wide band converter used with the Reflectoscope gives frequencies of 5, 10, 15, 20 and 25 megacycles.



Turntable facilitates inspection of forged billets. Shown are some instruments used in immersion test





Relatively thin materials ($\frac{1}{2}$ inch and less) normally produce signal reflections too close together to reveal flaw echoes between front and back reflections. Equipment allows separation of vertical traces on the face of the cathode ray tube, giving a better working space for flaw detection. Higher frequencies (15, 20 and 25 megacycles) will detect large grain size, lamination near surface, segregate and small needle-like discontinuities in extruded bars.

Crystals—A number of crystals are available for immersed scanning. For example: The $\frac{3}{4}$-inch diameter crystal that is adaptable to parts with narrow sections and small surface areas; and the "paint brush" crystal that is designed for scanning plates, bars and large flat sections. It is three $\frac{1}{2}$ by $\frac{3}{4}$ inch crystals mounted in parallel.

Calibrating each crystal to a test block or standard is mandatory each takes a varying degree of sensitivity to get the 1-inch, full amplitude height that is normal standard from test block. Line voltage changes also affect height of signal and frequent reference should be made to test block.

Another variable is the water gap: Speed of sound in water is much slower than in metal being tested. Calibration water gap should be held when testing material.

Sample—Image on face of cathode ray tube from a good forging shows a vertical trace at the left (Photo, p. 120). Trace is the sound wave leaving the crystal face. Crystal was moved from the flash weld toward the shoulder on the forging and completely around the outside diameter of the tube. Blip about an inch to right of initial pulse in the reflectogram (See p. 120) is the echo from the crack when the crystal is back against the flash.

This blip increases in height and moves from right to left as the crystal moves closer to the crack, until the blip moves into the initial pulse, indicating that the crack is directly below the crystal. Some false blips were picked up from weld spatter, tool marks and fine segregation in forging.

Adapted from a paper by L. Ravelle, Douglas Aircraft Co., Inc., Santa Monica, Calif., which was presented recently before the Society for Nondestructive Testing Inc. of Los Angeles.

Two Approaches To Mechanization

1 *Hotpoint's new refrigerator plant adds some new chapters to the industry's book of mass production recipes*

WHEN Hotpoint decided to build its new refrigerator plant in Cicero, Ill., planners vowed that it would be ahead of its field in ideas, techniques and skills. Appliance manufacturers who have visited the million-square-foot plant agree that they kept their pledge.

Some 1500 employees turn out a complete refrigerator every 40 seconds. Almost all of the production equipment is new and most of it was specially designed for the highly-engineered operations.

Basic Ideas — Maintaining the high production rate involves a staggering intra-plant flow of materials. To eliminate much of this logistic problem, Hotpoint runs its 7000-foot main assembly line into the component parts departments instead of bringing the parts to the line. This feature also means that production control departments meet assembly line schedules right in their own departments without contacting other departments for co-ordination of schedules.

Material in the new plant flows generally from west to east with the exception of cabinets, doors and food liners which are made in what used to be storage area for the electric range plant. All parts and components move from department to department on trolley conveyors which snake across the ceiling areas, occasionally dipping to floor level for a production or testing operation. Total conveyor length, run end to end, would be 9.8 miles.

Four Sections—Plant is actually composed of four assembly sections: Evaporator (freezer) section, condenser (heat dissipator) section, compressor (hermetically sealed motor and pump) section, and cabinet and food liner section. The compressor is the only component not manufactured in this plant.

In the evaporator section, rolls of aluminum strip go through a special machine which straightens, shears and then stacks the sheets. Three Struthers-Wells press brakes pierce, emboss and flange the sheet which is then washed prior to the brazing of evaporator tubing on the sheets. Another specially-designed machine automatically shapes tube and sheet assembly to fit an evaporator back (placed in the machine before start of cycle), and resistance welding points move down to

2 *Curtiss-Wright shows how a nonconsumer product can emerge profitably from a mechanized, automated line*

NEVER a mass-production proposition by consumer sales standards, aircraft engine assembly now turns up as a function that lends itself to most of the techniques devised by the more traditional consumer goods producers.

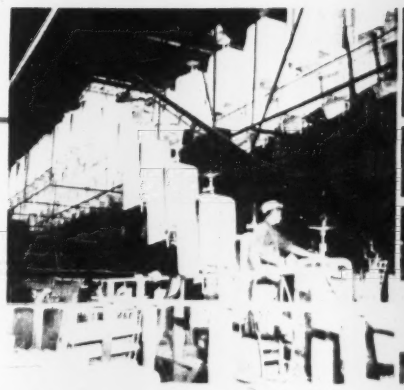
To Curtiss-Wright Corp., application of progressive mechanized principles to fit assembly of its turbo compound engines takes less space, means greater capacity, better product. The new line in its Wood Ridge, N. J., plant has 250 per cent greater capacity than the system it replaced. It occupies 42 per cent less plant space. Quality standards go up as a result of automatic machines that can function more accurately than any number of skilled men.

Eliminated is a slow-moving setup, devised during World War II, which was automatic only to the extent that a floor conveyor pulled engines on stands past 25 assembly stations on a predetermined time cycle.

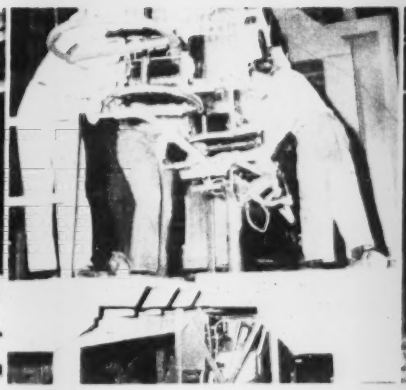
Mechanized but Flexible—Despite its high degree of mechanization, the line produces several models of the turbo compound rated from 3250 to 3500 hp. Rolling today are commercial models for the new Lockheed Super Constellation and the Douglass DC-7, in use by 22 different airlines. Military models are produced at the same time for such aircraft as the Navy's P2V patrol bomber, P5M flying boat, R7V-1 transport and the Air Force C119 troop and cargo carrier and RC-121 transport. In addition, the line is set up so more powerful models, planned for the future, can be assembled with the same procedure.

Actually, assembly organization encompasses two identical lines, designed around an elaborate test setup. The first, or green assembly, takes parts from finished stores and assembles the engine completely. The second, or final assembly, reassembles the same components after the engine is tested, taken apart and parts inspected.

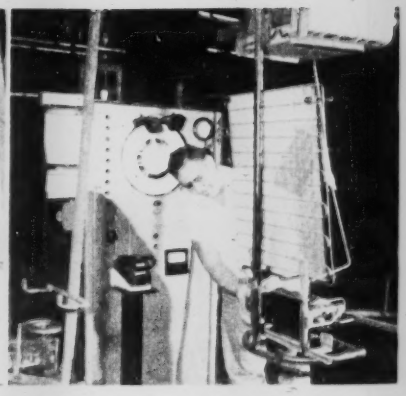
Conveyorization — Naturally, a major factor is almost complete conveyorization of parts movement. Conveyor and belt system moves parts progressively from the time they are taken off shelves in finished stores until they are applied to an engine. Parts carriers that are a part of the conveyor system provide minimum manual handling throughout. A total of 45 different types of these specialized pallets are employed to move various parts through assem-



Overhead space is used to the fullest



Oven and vacuum carts dehydrate units



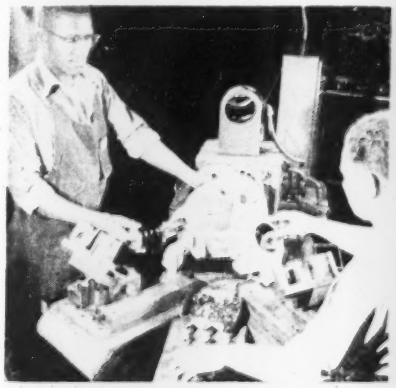
Units get system charges on the run

join the entire assembly. Total time: 15 seconds.

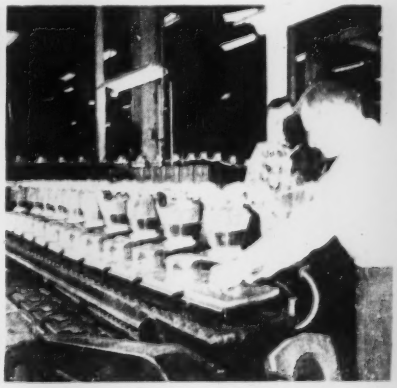
Something New—Unique in the industry is the fabricating unit for condensers, developed by National Welding Co. Flat jigs, equipped with combs to receive the rows of heat-exchanger wires, are rolled on a track beneath a magazine loaded with ready-cut wires. Spring-loaded mechanism loads one wire into each comb slot as fast as the jig is pushed through. Worker then places ready-shaped condenser tubing into place on top of layer of wires, and jig is pushed through another wire loader which puts a row of wires over the coils.

With condenser tubing thus sandwiched, jig rolls to a special automatic welder which completes 2600 separate welds in 13 to 15 seconds. Fusion is accomplished at every point of contact of wire with the coiled tubing.

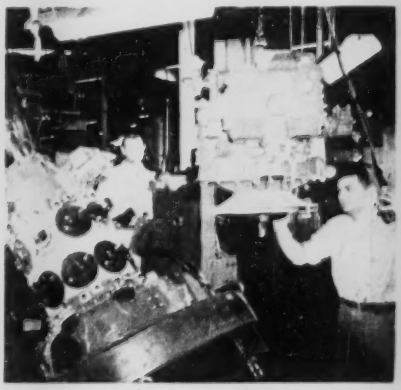
Tests Aplenty — Before leaving component fabricating areas, both condenser and evaporator are given extensive leak tests under pressure. Then as each part is joined later on, further leak tests are conducted. Main assembly monoveyor line starts in the vaporator department, moves to the condenser and mounting frame departments for those assemblies. Line then moves through tube fabricating department and then to the station where the compressor is added. Before



Inner cylinder parts go together



Cylinders move in for installation



Three major subassemblies positioned

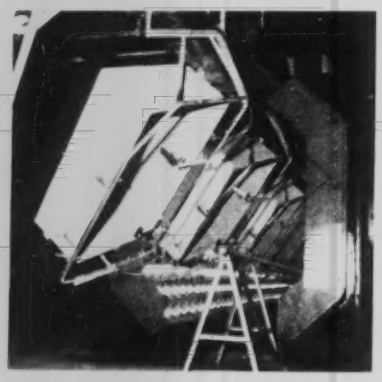
bly stages. All are protective-coated, with degree of coating hardness varying according to weight of engine part.

Procedure—Assembly procedure throughout is planned so engines are built up in three major subassemblies: Power section, front and rear sections. To accomplish this, major parts, such as crankcase front sections, connecting rods and rear housings, are moved from finished stores area on carriers over a roller floor-type conveyor to the conveyor loading area. There parts are palletized, washed and conveyed on to initial assembly area. Minor parts, such as bolts, nuts and wire, are delivered by rolling bins.

First stopover, green bench assembly, is adjacent to finished stores and fed by roller conveyors that originate there. Bench area consists of 15 different conveyor lines from which detailed engine parts are removed, placed in automatic torque and assembly machines and assembly fixtures.

Functioning of these machines exemplifies not only the effective speed of Curtiss-Wright mechanization, but its high degree of quali-

Hotpoint



Porcelain coat is dried before baking

last joint is silver-soldered, dry air is forced through system to check for obstructions, and the cooling unit is complete . . . except for more tests, vacuum dehydration, charging with proper amounts of oil and freon, and a dip in enamel.

Cabinets Coming—While cooling units take shape in the main building, food liners (inside shell of refrigerator), doors, cabinets and miscellaneous small parts are being fabricated in the adjacent building. Four respective lines move in north-south direction, with sheet steel entering from the south where it is leveled and cut into required sizes. Door steel is press fabricated, flanged, pierced and then welded on resistance machines. Cabinet steel goes to a notching press, then through Yoder rolling machine, Struthers-Wells tangent benders, then to National welder for joining to refrigerator backs.

Liner steel is blanked on a 400-ton press, pierced and embossed. It then goes through special flanging and "U" forming equipment, is washed, and then joined to liner sides by a 6-wheel seam welder.

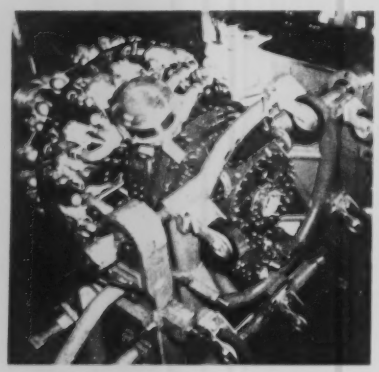
Finishes — Liners and drawers get porcelain finishes which starts with spray pickling in one of the largest Goodrich automatic machines yet built. Ground coat is applied, infrared-dried and then fired in electric furnaces. White coat is applied and the drying and firing puts final gleam on liners.

Interesting at this point in the handling system is the storage conveyor used for scheduling purposes. Operation permits vitreous enamel plant to operate on odd shift basis. If main assembly line is not running, vitreous department loads liners on for later use.

Doors and cabinets pass through six-stage washes followed by resin primer coat, 20-minute dry, then sanding and tack-wiping for better coating adhesion. Parts are then automatically transferred to grouping conveyor which passes through Ransberg No. 2 electro-static enameling room.

Assembly and Storage—Cabinets move directly to main assembly while doors first pass through subassembly for insulation, latch mechanisms, etc. Doors, cabinets, liners and cooling units meet on the main line where complete refrigerators quickly take shape. Box leak tests and final inspection take place, and seconds later a completely packed refrigerator rolls to storage bay.

Curtiss-Wright



Assembled engine in pre-oil rig

ty control as well. One machine, for example, runs down bolts holding a series of pinion gears to an identical torque or tightness and then, simultaneously, crimps fasteners that hold them in place.

Engine Takes Shape — From bench area, subassemblies are repalletized, conveyed to the end of the line and transferred to the slings in which they are moved by monorail to green preline assembly. Preline area includes seven stations where basic engine takes shape, excluding external parts.

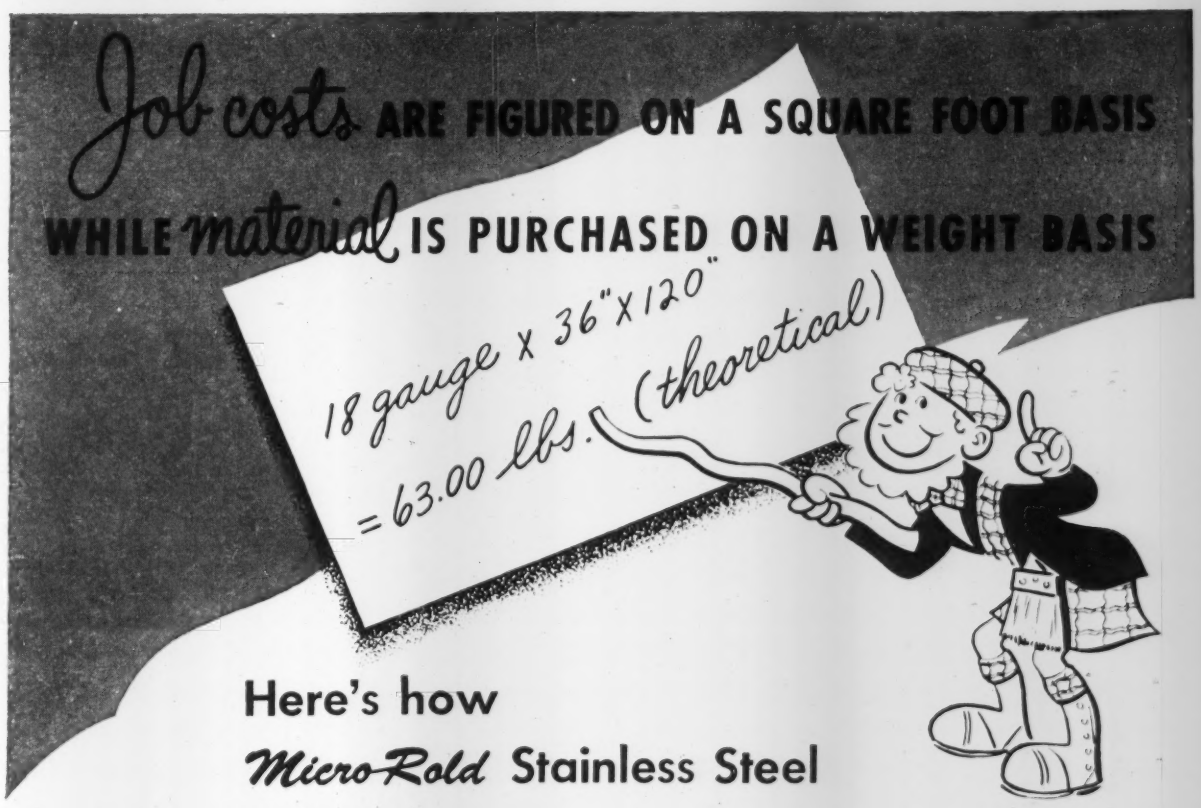
Last stop is actual green line assembly. Here, a series of progressive stations each can position one engine. The turbo compound, previously mounted on a vertical rolling stand as it grew through preassembly, is now positioned over a powered floor-type track conveyor that moves it in a predetermined cycle for assembly of external parts.

Prove and Test—When an engine emerges intact from the last green station, the elaborate proving and testing setup takes over. Weighed and advanced to a department called engine pre-oil, it is rigged up to simulate actual running conditions for measuring internal friction and making sure all connections are tight. Then carburetor is installed, engine is washed, air-blown dry and delivered to test preparation area for attachment of external equipment, such as fuel and oil lines, wires, starter and fuel pumps.

Twelve test cells provide facilities for all the turbo compounds. Each engine operates about $4\frac{1}{2}$ hours, while run-in of new parts takes place and carburetion, ignition, power output, vibration, fuel and oil consumption, leakage and operating temperatures are checked.

Together Again — No matter what the test results, each engine is disassembled in reverse order to its assembly to permit an even closer look at quality. Parts are removed, tagged, placed in pallets, advanced through wash booths, blown dry and conveyed to inspection.

The end comes when, inspection completed, parts go back through proper stations to final assembly. There identical methods and sequences as are employed in green area function to reassemble and retest the engine.


Job costs ARE FIGURED ON A SQUARE FOOT BASIS
WHILE material IS PURCHASED ON A WEIGHT BASIS
18 gauge x 36"x120"
=63.00 lbs. (theoretical)

Here's how *MicroRold* Stainless Steel SAVES you money

In the use of stainless steel, the selection of gauge number is usually determined by the minimum permissible thickness having sufficient strength to meet the requirements of the application. When you receive material on the heavy side of the gauge you are paying a premium for stainless surface area.

When sheets are ordered by gauge number, the permissible A. I. S. I. variation in thickness is plus or minus 10%. Thus, if you order 18 gauge, you may receive sheets .052" thick, when a thickness of .0175" would suit your purpose. Using a standard 18 gauge 36" x 120" sheet as an example, the theoretical weight is 63.00 pounds, but this weight could permissibly vary between 59.22 pounds and 65.52 pounds. Each .001" of thickness adds 1.26 pounds per sheet.

MicroRold sheets may be ordered by gauge number and you can specify they be rolled on the light side of the gauge range. This is true because the equipment is such that more accurate control of thickness is possible.

If you are not a user of MicroRold sheet it will pay you to get the full details. Your steel warehouse distributor will gladly tell you the MicroRold story.

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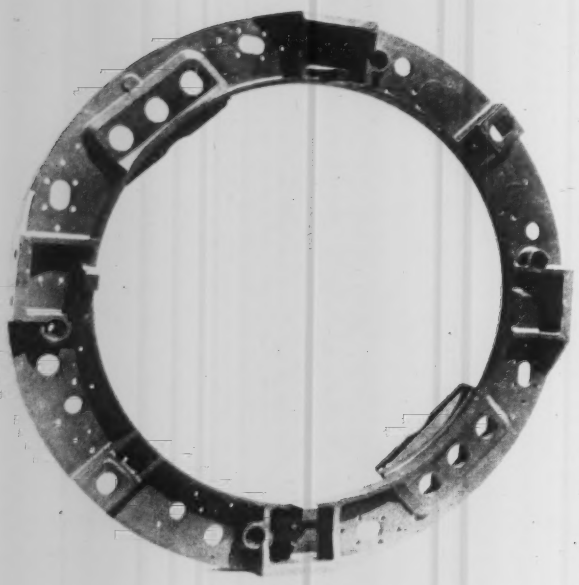


Thorium Improves Magnesium Alloys

Castings made with experimental alloys indicate they will be easier to handle than rare earth alloys. Thorium makes alloying with zirconium easier and ups recoveries

ALUMINUM alloys, incumbent lightweight champion of commercial castings, may find serious challengers in magnesium alloys containing thorium.

Although thorium is an expensive alloying element, preliminary research indicates it imparts outstanding mechanical properties to magnesium alloys at ambient and elevated temperatures. In fact, these alloys can replace aluminum alloys using the same sections, according to a paper presented before the recent 9th annual meeting of the Magnesium Association.

The author, H. G. Warrington of Dominion Magnesium Ltd., Haley, Ont., said foundry difficulties are confined to metal preparation. He reported sound castings have been obtained, which have uniform properties and are not affected by section thickness.

Other Conclusions—Alloys containing 2 to 3 per cent thorium show good ductility and remarkable stability of properties after heating. Properties suggest that sand castings can be formed by hot or cold work and still retain required mechanical properties, even in a welded assembly. Warrington stated that satisfactory repairs or assemblies can be made by welding.

Another consideration is that unlike the cerium rare earths, thorium is not lost by reaction with chloride fluxes, and sudden heavy scrap loads can be recirculated without loss of the most expensive component.

Important to the foundryman is that these alloys appear to be easier to handle than rare earth alloys. Presence of thorium makes alloying with zirconium easier and gives higher zirconium recoveries.

Two Alloys—For creep resistance, magnesium base alloy, ASTM designation HZ 32, was used. It has 3 per cent thorium, 2.3 per cent zinc and 0.7 per cent zirconium. Other magnesium alloy, ZH 62, contains 5.8 per cent zinc, 1.9 per cent thorium and 0.7 per cent zirconium.

Dominion made thorium metal by direct reduction of ThO_2. Overall alloying efficiencies of 95 to 100 per cent were reported with a preliminary master alloy containing 20 per cent thorium, balance magnesium. Thorium powder sintered into a spongy mass was found to alloy directly quite readily with efficiencies over 90 per cent. Zirconium was added as a flux-free, master alloy containing 20 per cent zirconium, balance being magnesium and zinc.

Zirconium efficiencies in the presence of thorium were good, with figures running 65 to 69 per

TABLE I

HZ32 Magnesium Base Alloy for High Creep Resistance Composition: Thorium, 3.0%, Zinc, 2.3%, Zirconium, 0.7%. Test made at 95 C

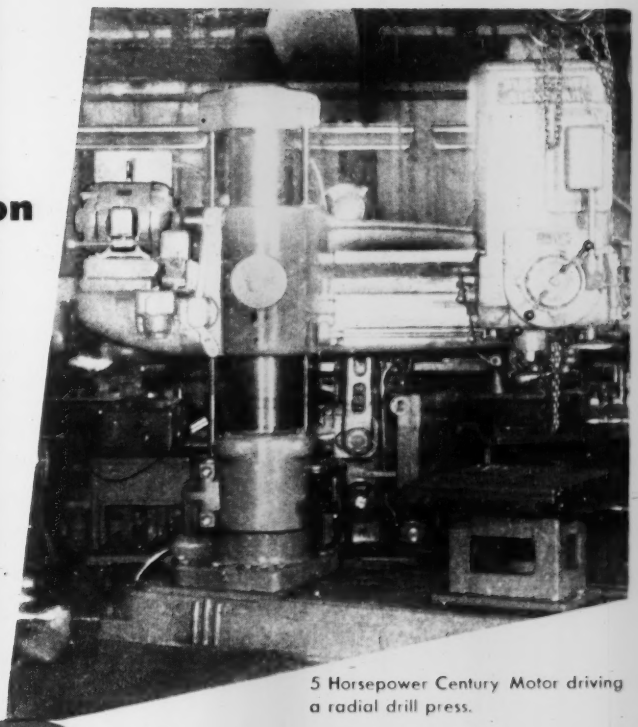
0.2% P.S. psi	U.T.S. psi	Elongation
13,000	30,000	10.0

TABLE II

ZH62 Magnesium Base Alloy for High Strength at Ambient Temperatures Composition: Zinc, 5.8%, Thorium, 1.9%, Zirconium, 0.7%

0.2% psi	U.T.S. psi	Elongation
22-24,000	40,000	10.0

On Your Production Machines . . .



5 Horsepower Century Motor driving a radial drill press.

Hold That Precision Line

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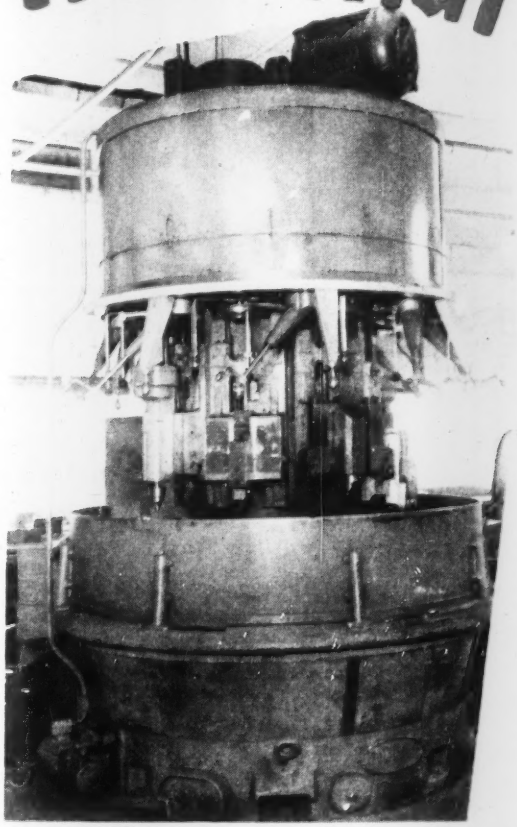
Widely Known for Their Unusual Freedom From Vibration

Century motors supplement the precision of fine equipment . . . resulting in closer tolerance of the product produced by the equipment.

The unusual freedom from vibration in Century motors is contributed by: Accurate concentric machining to provide a uniform magnetic airgap between the rotor and stator . . . Balanced electrical design . . . careful dynamic rotor balancing . . . accurately machined mounting surfaces.

Century offers a most complete line of types and sizes from 1/8 to 400 horsepower.

Specify Century motors on your original equipment. Call a Century branch office or a Century Distributor for your motor requirements.



25 Horsepower Century Motor on a Bullard Automatic.

Century C MOTORS

CENTURY ELECTRIC COMPANY
1806 Pine Street
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CE-759

cent. Enough scrap was built up to run plant-scale foundry tests employing a 60 per cent circulating load.

Properties—First feature noted was the tendency to burn. This was more noticeable with straight thorium alloys; but even those containing zinc oxidized at a greater rate than magnesium alloys containing aluminum or rare earths, when temperatures were taken above 1460 F.

Early castings misran on sections normally expected to fill easily, but fluidity tests demonstrated that at equivalent superheat, alloys containing thorium were at least as good as AZ91 alloy. Castings sectioned showed apparent lack of fluidity was due to clogging of gates and perforated screens by oxide formations. By reducing melting, holding and pouring temperatures, plus more careful flux covering and refining, misruns could be avoided.

On the Line—Production runs were made on a gas turbine component which required about 400 pounds of molten metal. Circulating scrap load of 60 per cent was used to dispose of material accumulated for experimental work. New metal was alloyed with sintered thorium metal and with a 20 per cent magnesium-thorium master alloy alternately. Zirconium was added as a master alloy.

Castings were poured at 1350 F and risers were topped at 1400 F. No burning or excessive oxidation was encountered. Castings were clean, free from dross and had no signs of shrinkage porosity, but over-all shrinkage was increased. Some components over 20 inches in diameter may need new patterns. However, difference between HZ 32 and rare earth alloys was not great.

Welding—Test results indicated cooling rates did not greatly affect mechanical properties, suggesting the possibility of welding. Excellent welds, including the joining of broken test bars, were obtained with shielded arc welders and $\frac{1}{8}$-inch diameter rod of the parent metal composition. Strengths exceeded typical properties of the alloy and ranged between 95 and 110 per cent of the actual strength of samples.

Cutter Slices Lug Milling Time . . .

From 17 to 4 minutes to cut three clutch lugs. Carbide inserts chew through SAE 4140 hot-rolled steel at 588 sfm with a 20-inch feed rate

INCREASED CUTTER life of 250 per cent coupled with a reduction in milling time of 75 per cent was recently obtained on clutch lugs at Ernest Holmes Co., Chattanooga, Tenn., by a drastic changeover from conventional high-speed steel slotting mills to staggered-tooth tungsten carbide cutters.

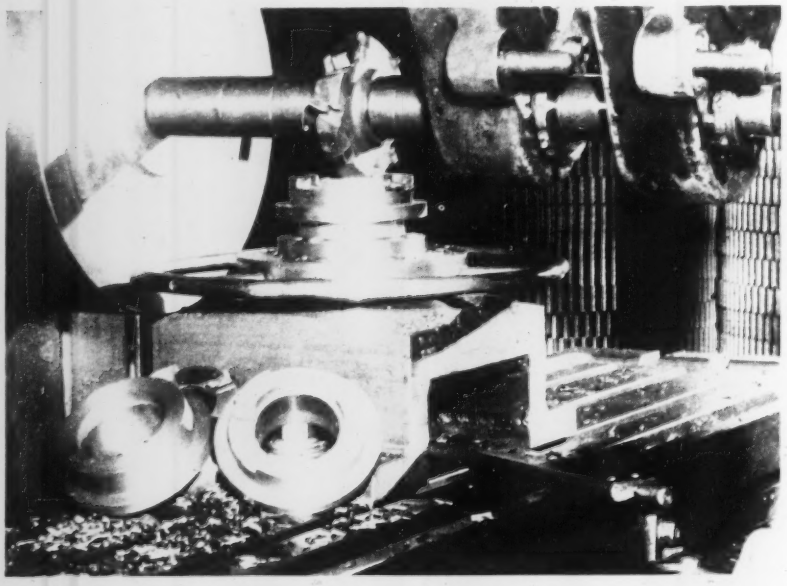
Operation consists of making six passes (three per side) to form three lugs on each side of a 4-inch diameter by $1\frac{3}{4}$-inch thick, SAE 4140 hot-rolled steel positive clutch.

Previous cutter was of 6-inch diameter having 28 cutting teeth. It was run at $3\frac{3}{8}$-inch feed rate, 80 sfm, taking a 5/16-inch depth of cut. Under these operating conditions milling time per clutch lug was 17 minutes while cutter life was 52 pieces per grind.

Output Boosted—Now, with a 5-inch diameter cutter having eight brazed-in teeth of Kennametal grade K2S, the job is handled at the same depth of cut but at 450 rpm, with a 20-inch feed rate and 588 sfm, production time is 4.1 minutes per piece with cutter life averaging over 150 pieces per grind. Chipload is 0.0055-inch.

New tool employs standard style K-1400 tungsten carbide blanks brazed into the cutter body at a 15-degree negative radial rake and 25-degree negative axial rake, so its staggered teeth project beyond the unit's body to produce a 1-inch wide cut.

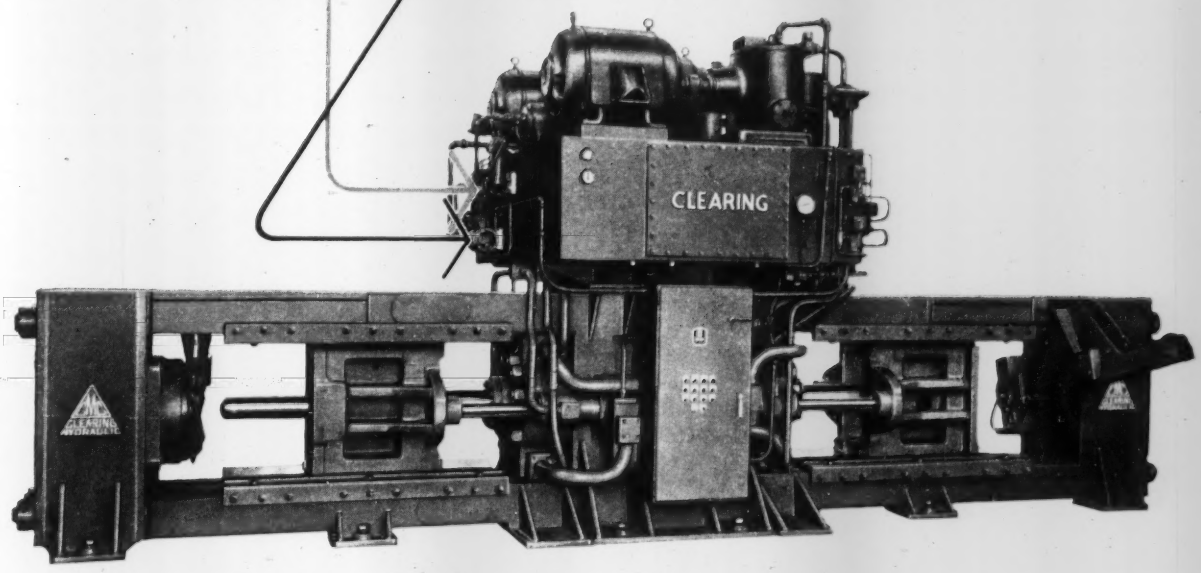
Flywheel of $14\frac{1}{2}$-inch diameter is used on the arbor to assure smooth power flow to the carbide tipped cutter whose longer life and ability to operate at higher speeds provide a substantial production increase on this particular job.



Workpiece blank and finished part lie beside indexing fixture. Staggered-tooth cutter does the job in jig time. Operation takes six passes—three per side—to form three lugs. Job cycle time is 4.1 minutes per piece

rapid-fire production of 90 mm shell cases no menace to properly cooled hydraulic oil

CLEARING DOUBLE-END PRESSES ARE ROSS EXCHANGER EQUIPPED



With a capacity up to 330 tons on each side, closing and returning speeds of 2200 ipm and a pressing speed of 200 ipm — this Clearing Double End Horizontal Press has been designed to produce large volumes of 90 mm shell cases to rigid ordnance specifications.

To maintain a combined three-pump capacity of 231 gpm, by preventing overheated, thinned oil, Clearing Machine Corporation equipped this press with Ross Type BCF Exchangers. *Dependable cooling is assured!*

Throughout the metal working industries, on numerous types and makes of prime equipment, Ross Exchangers are assigned the important job of keeping temperature under control: in engines, lubrication systems, compressors, centrifugal pumps, die casting machines, metal drawing presses, welders, speed increasers . . . and as quenching and cutting oil coolers.

Widely preferred for their high thermal efficiency and extreme ruggedness, all copper and copper alloy Ross Type BCF Exchangers are pre-engineered, fully standardized and readily available.

For detailed information, request Bulletin 1.1K5.

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For Cheaper Heats . . .

BUDGET BTU'S

Automatic control systems keep tight rein on fuel consumption and save refractory roofs on open-hearth furnaces by avoiding exposure to excessively high temperatures

By M. F. HALL
Instrumentation Engineer
Minneapolis-Honeywell Regulator Co
Industrial Division
Philadelphia

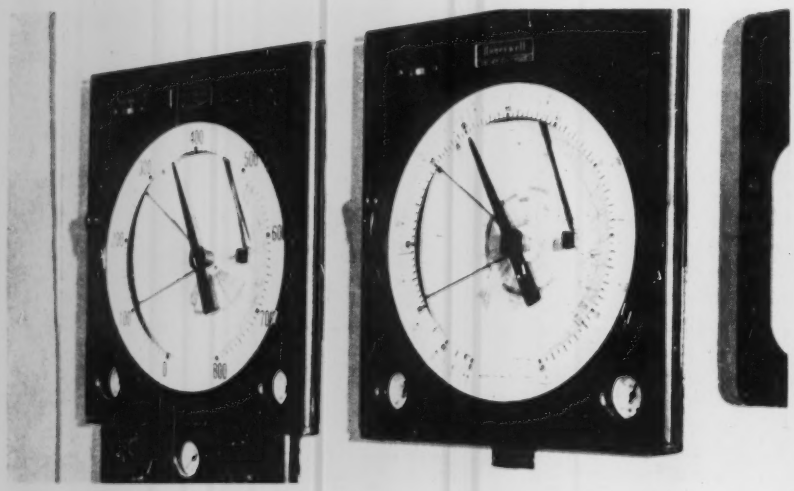
AIM of all steel mill operators is to achieve peak production at minimum operating costs.

One mill that seems to come as close to this ideal as can be expected is U. S. Steel's Fairfield Steel Works, Birmingham, Ala., plant, which has 12 open-hearth furnaces turning out some 5000 tons of steel every 24 hours. It's an example of how modern automatic control methods can boost steel processing efficiency.

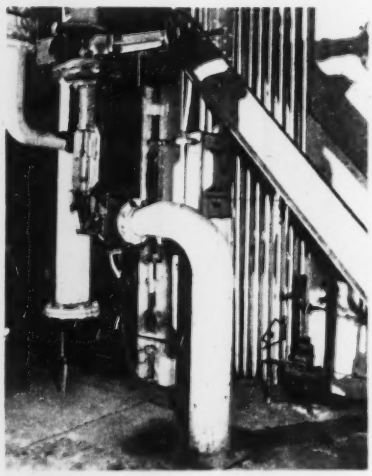
Fairfield plant utilizes a multiplicity of industrial instruments to indicate, record, integrate and automatically control flow of liquid and gaseous fuels to open hearths. Dividends: Marked savings in fuel consumption and refractory life.

Cost Items—Since each open hearth has a capacity of about 200 tons per heat, with temperatures in the neighborhood of 3000° F from 10 to 12 hours, it isn't difficult to appreciate the fact that even a small saving in fuel consumption per furnace per hour can add up to a big cost cut.

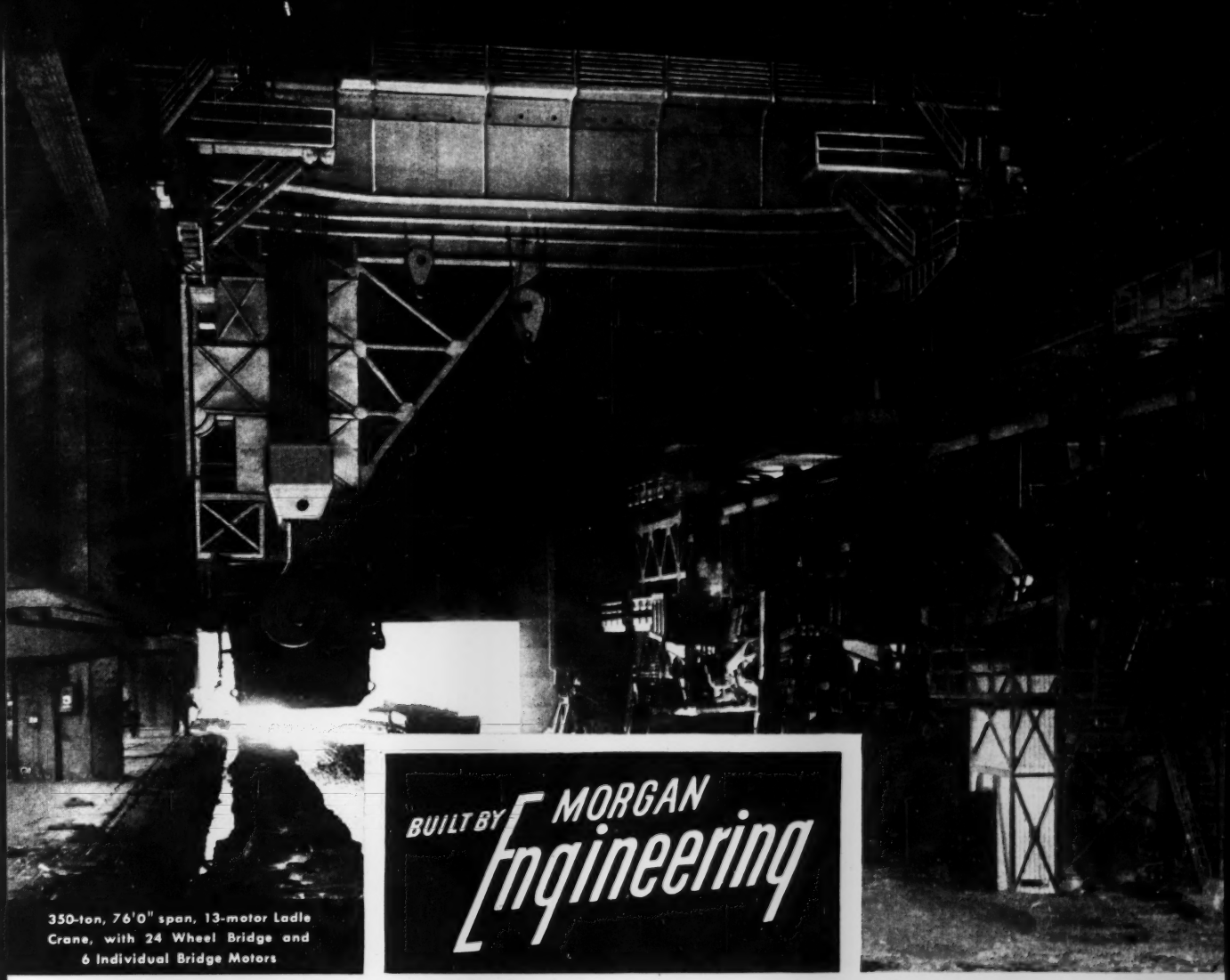
Moreover, refractory roofs of open hearths have their lives materially shortened by exposure to excessively high temperatures. Proper regulation of fuel flow can increase refractory life by holding furnace temperatures below the critical level. By lengthening time between campaigns, steel



Electronic integrating flow controllers regulate the gaseous and liquid fuels going to open-hearth burners. First helper does not have to leave the panelboard



Flow meter (indicated by arrow at right) measures, and diaphragm valve controls flow of gas to the burners



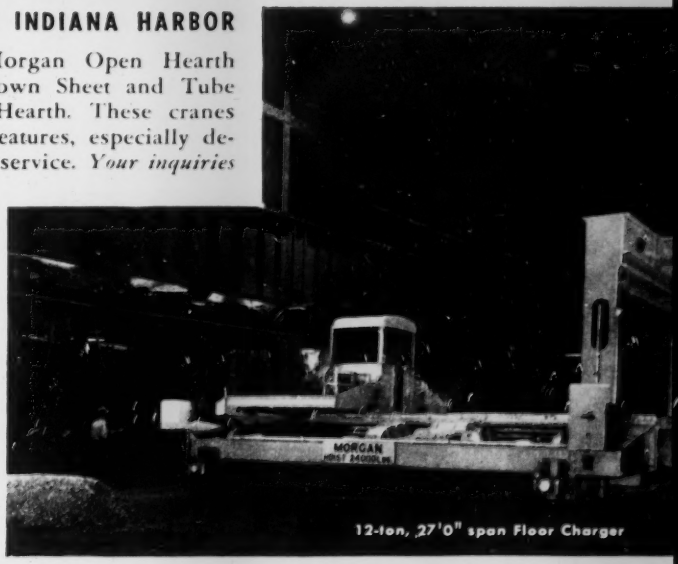
350-ton, 76'0" span, 13-motor Ladle Crane, with 24 Wheel Bridge and 6 Individual Bridge Motors

BUILT BY MORGAN Engineering

MORGAN CRANES AT INDIANA HARBOR

Illustrated are three Morgan Open Hearth Cranes at The Youngstown Sheet and Tube Company's new Open Hearth. These cranes have all latest modern features, especially designed for Open Hearth service. *Your inquiries will be appreciated.*

25-ton, 8-motor, 107'0" span Soaking Pit Crane



12-ton, 27'0" span Floor Charger

THE MORGAN *Engineering* CO. ALLIANCE, OHIO • Pittsburgh, 1420 Oliver Building

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ANNOUNCING the new BRYANT

BRYANT proudly introduces the newest member of the Bryant family of precision machines — the Bryant 998 Boring Machine — a production machine for precision boring, drilling, turning, facing, grooving and contour turning and boring where fine finish and rapid production are desired.

The Bryant 998 can be tooled either as a single purpose machine for quantity production or for miscellaneous work on small lots. Because it is all-mechanical, its cycle is positive and constant.

Smooth, uniform motion of the table and freedom from vibration, so essential to generating a fine finish with a single point tool, are assured by the 998. Its bed, bridge, heads and table are Mechanite castings. The table moves on preloaded ball bearing slide bars and is mechanically actuated by a simple cam and lever unit. Cam and change gears are easily accessible for changing either the length of stroke or the rate of travel. The motors for driving the cam and the boring heads are mounted in an accessible cavity inside the bed, thus keeping floor space to a minimum. This cavity is fan ventilated.

Ample fixture mounting surface is provided by the table, which measures 17½" x 22". The table has three ½" T-slots, and will accommodate a wide variety of fixtures. Machined setup pads are provided on the bridge for ease in locating fixtures.

The design of the Bryant 998 takes full advantage of standard purchased parts. Brakes, motors, air cylinder, bearings, pneumatic follower system, lubrication hoses and all electrical apparatus are stock items. Either low or high pressure coolant systems are available. All electrical equipment conforms to J. I. C. standards.

BORING MACHINE

Design

- The bed, bridge, table and heads are normalized Meehanite castings.
- The cam actuated table moves on preloaded ball slide bars.
- The cam is hardened and ground.
- The boring head spindles rotate in preloaded super-precision ball bearings. A graduated spindle nose and eccentric bushing for tool setting are standard.
- An air cylinder opposes the work table motion directly with constant pressure and keeps the cam follower roll and the cam always in contact.
- The boring head drive is completely accessible and is designed for long life.
- The cam drive assembly is protected by a torque limiting clutch.
- Cycle time is controlled by precision change gears in the cam drive gear box.
- An ample pad is provided at the rear of the machine for mounting accessory equipment.

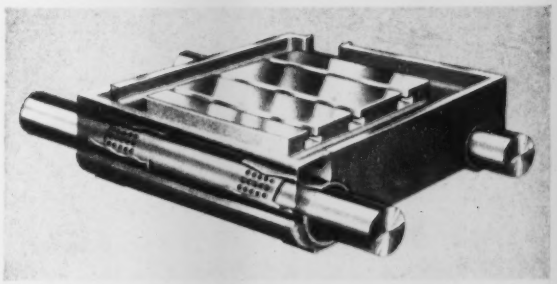
Operation

- Push button controls are conveniently located on a panel at the front of the machine.
- Cycle can be manual, semi-automatic or fully automatic.
- An emergency stop button will instantaneously interrupt the cycle.
- Jog buttons are located on both the front and the rear of the machine for setup purposes.
- Machined setup pads are provided on the bridge for ease in locating fixtures.

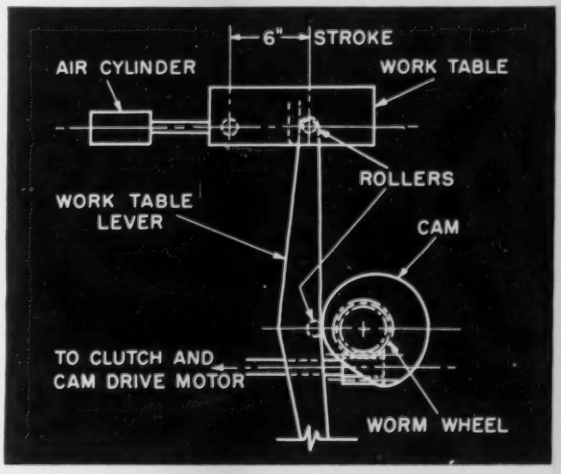
Maintenance

- Maintenance is necessary at only three points: two grease fittings on the cam follower assembly and cleaning and lubricating of the filter-lubricator unit in the pneumatic system.
- The ball slide table is grease sealed.
- Gear box has its own closed lubrication system.
- The boring head bearings are permanently grease sealed.
- The cam is easily accessible for changing the table stroke. It is taper mounted and keyed to the drive shaft to ensure ease of changing and accurate mounting.
- The change gears are enclosed in their own wet sump, splash lubrication system.
- Brakes, motors, air cylinder, bearings, pneumatic follower system, lubrication hoses and all electrical apparatus are standard purchased parts.

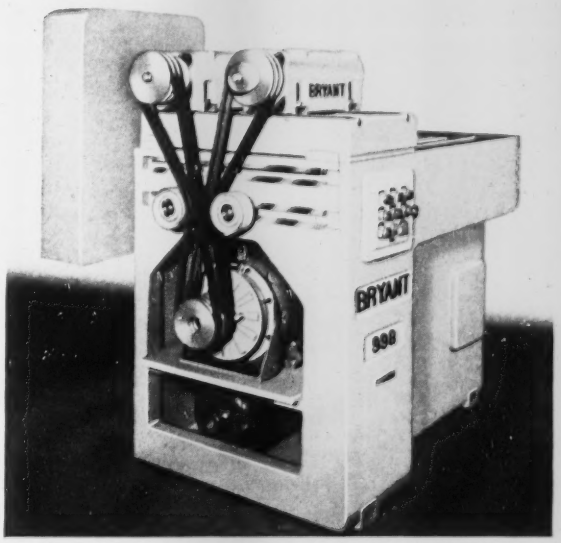
Write today for complete information and specifications!



Smooth response of the table is ensured by the special Bryant slide bar design. Each bearing is a hardened steel sleeve containing numerous $\frac{3}{8}$" diameter preloaded balls. This provides a metal-to-metal contact which resists forces in all directions and transmits stresses directly to the bed.



The table is actuated by an inexpensive, quick-change cam working through a follower and lever arm. An air cylinder opposes the work table motion, keeping the cam follower and the cam always in contact to completely eliminate back-lash and jump.



Cam drive and boring head motors are mounted in a well ventilated cavity in the bed.

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Springfield, Vermont, U. S. A.

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is produced at a lower operating cost over any given period of time.

Fuel Flow Control—Before installation of automatic control systems, fuel to each open hearth was controlled manually by the first helper. Instruments on the control panelboard indicated and recorded fuel flow. However, when a change in Btu input was necessary in use of coke oven gas, first helper left the panelboard and manually readjusted gas valves located at both ends of the furnace. After making the adjustment, he had to go back to the panelboard to observe resulting change in fuel flow.

With the new system, first helper changes Btu input without leaving the panelboard. Two panel-mounted electronic inductance bridge receivers, developed by Minneapolis-Honeywell, indicate and record flows of liquid and gaseous fuels to the burners and integrate and automatically control these flows.

Double Scale—Since the first helper is basically interested in Btu input to the furnace, gas flow controller is equipped with a double scale that is graduated 0-85 and 0-120 million Btu's per hour. One is for natural gas, the other for coke oven gas.

Liquid flow controller, which handles tar or fuel oil, is calibrated 0-800 gallons per hour, but will be converted to read Btu's per hour.

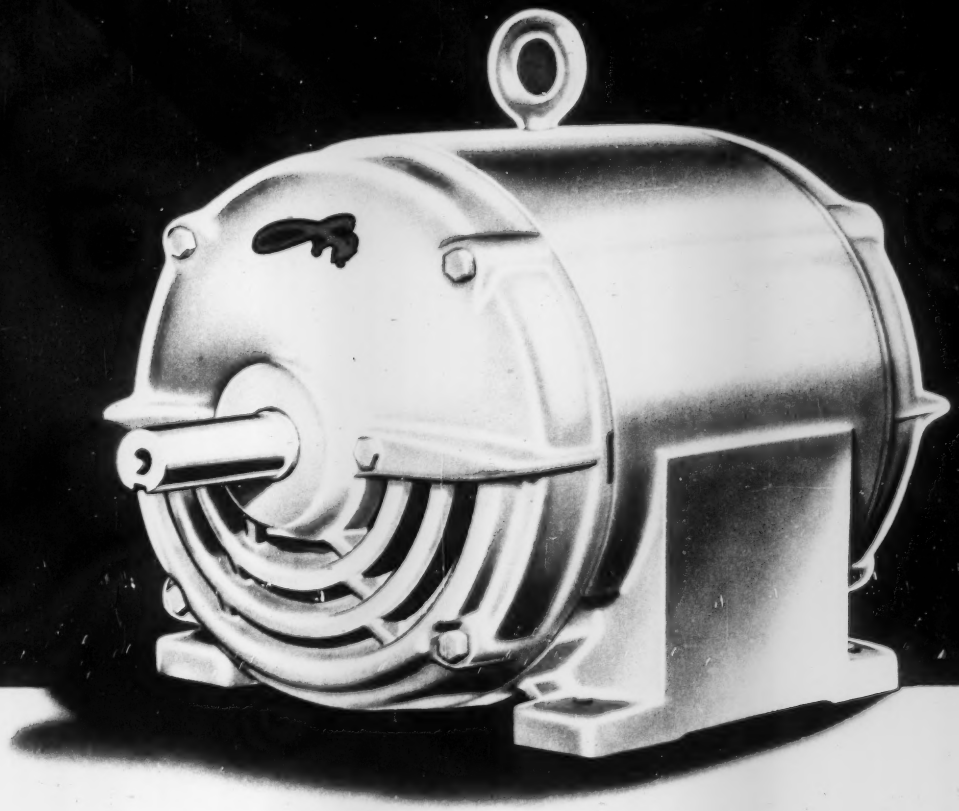
Each instrument incorporates a pneumatic control unit plus an electronic integrator. This totalizes flow of the measured fluid. Control unit in the gas flow controller operates a diaphragm operator that positions a 6-inch butterfly valve in the gas line. Similar control unit in the second instrument operates a ¾-inch valve in the liquid fuel line.

Two for Four—Although four fluids (natural or coke oven gas, tar or fuel oil) are used to fire open hearths, only two meter bodies are needed. Both use electric transmission. Low differential type flow transmitter meters flow of either gas. Error in measurement introduced by differences in specific gravities of the gases is too little to affect satisfactory operation of the control system.

Flow of liquid fuels is measured

Not just a "face-lifting" to meet the new NEMA standards,
but a completely redesigned motor line

The Louis Allis Co. proudly presents the NEW L.A. *Line of electric motors*



. . . the concentrated utilization of over 50 years of engineering and development brings you this new concept in motors.

Please turn the page . . .

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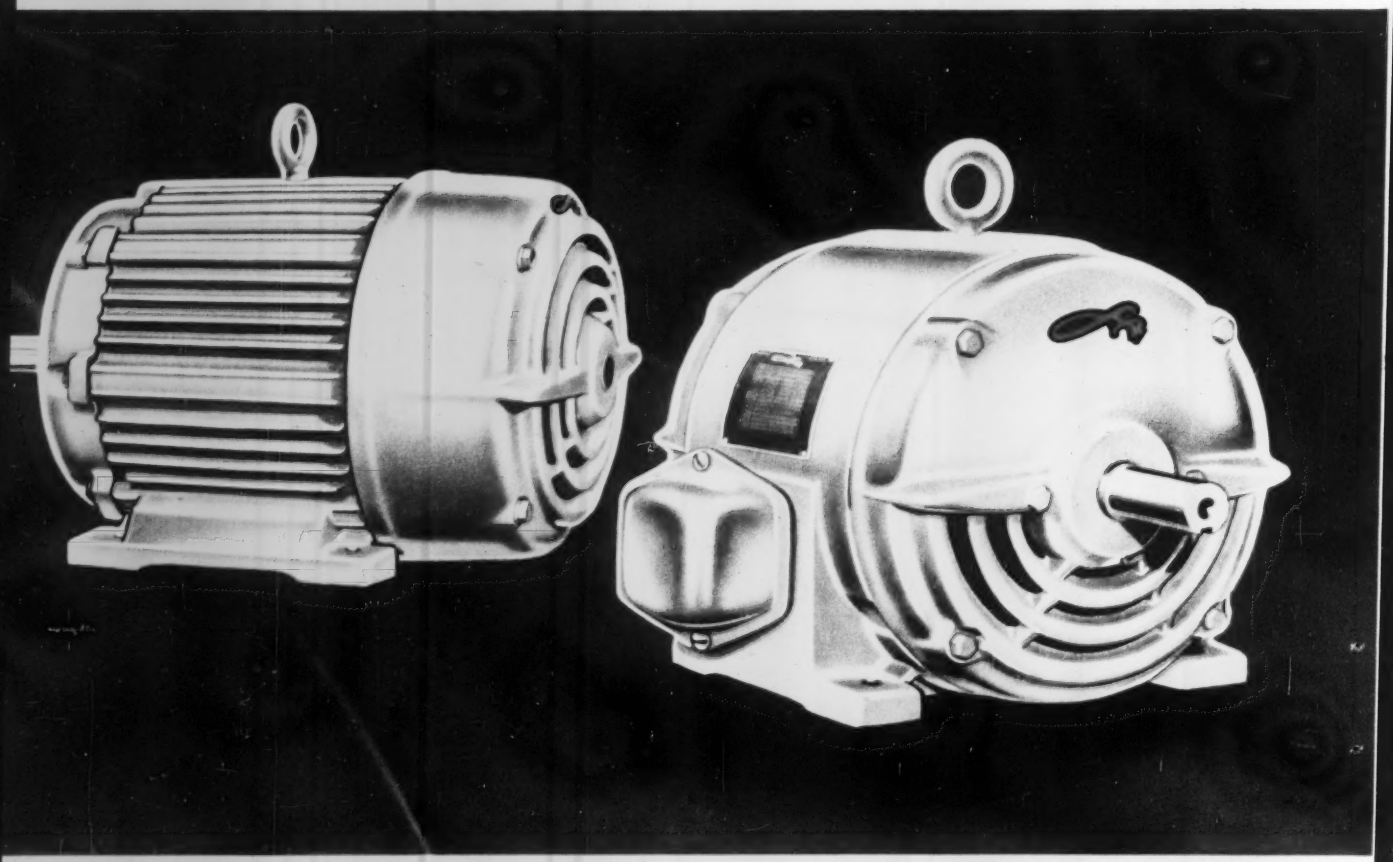

New L. A. Fan-cooled and Explosion-proof Motor

▲ New L. A. Open Drip-proof Motor

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Here's the motor that's entirely new through and through, with such features as new modern styling . . . improved ventilation . . . greater protection . . . new conduit box arrangement . . . new bearing construction . . . and more versatile mounting. Get the facts on the most up-to-date motors available—the new L.A. line. See how these new motors can provide more power in a smaller package for your product or plant . . . with the same high standards of Louis Allis performance, temperature ratings, service factors and torques. Call your Louis Allis Sales Engineer for the complete story.

Special Note *Louis Allis motors, built to the same high standards of quality and performance in the old NEMA standard frame sizes, will still be available if you require them for interchangeability or replacement.*

THE LOUIS ALLIS CO. · MILWAUKEE 7, WISCONSIN

Printed in USA

by an area meter which is piped to handle either tar or fuel oil. When tar is fired, it passes through a heat exchanger before entering the meter body. Measuring error of about 10 per cent is caused by differences in specific gravities of tar and fuel oil. Compensation is a difference of about 10 per cent in Btu contents of the two fuels.

After meter body has been measuring tar flow, it is flushed out before being used to meter fuel oil. When a change from fuel oil to tar is made, this is not necessary.

Capacity—Although normal liquid fuel flow to open hearths is about 200 gallons per hour, liquid fuel flow controller has a range of 0-800 gallons per hour.

High range was selected to handle winter periods when supply of natural gas is restricted and liquid fuel input must be stepped up to supply required Btu's to the furnace. It was found that control is equally accurate at both high and low flow rates.

Savings—Savings in fuel and refractories are largely due to two factors: First, helper can quickly tell exactly how much fuel is flowing to the furnace and has the assurance that the indicated rate will be maintained automatically. Secondly, when a change in fuel rate is called for, he only resets control indices of two instruments, an operation that does not take him from the panelboard.

Die Manual Available

An enlarged Die Manual is available from Verson Allsteel Press Co. It contains 112 pages devoted to a pictorial presentation of Verson press brake dies and special tooling along with text and tables on how to select dies for specific jobs, tonnages required, etc.

This edition has been developed and organized to be as convenient and helpful to the user as possible. Bound in spiral plastic, it lies flat when opened.

The manual covers all commonly used types of brake dies. For a free copy write to: Verson Allsteel Press Co., 9318 S. Kenwood Ave., Chicago 19, Ill.

Wrap Out Rust

with NOX-RUST Vapor-Wrapper

New Chemically Active paper—in sheets, rolls, bags, envelopes and caseliners—blocks rust in one simple operation.

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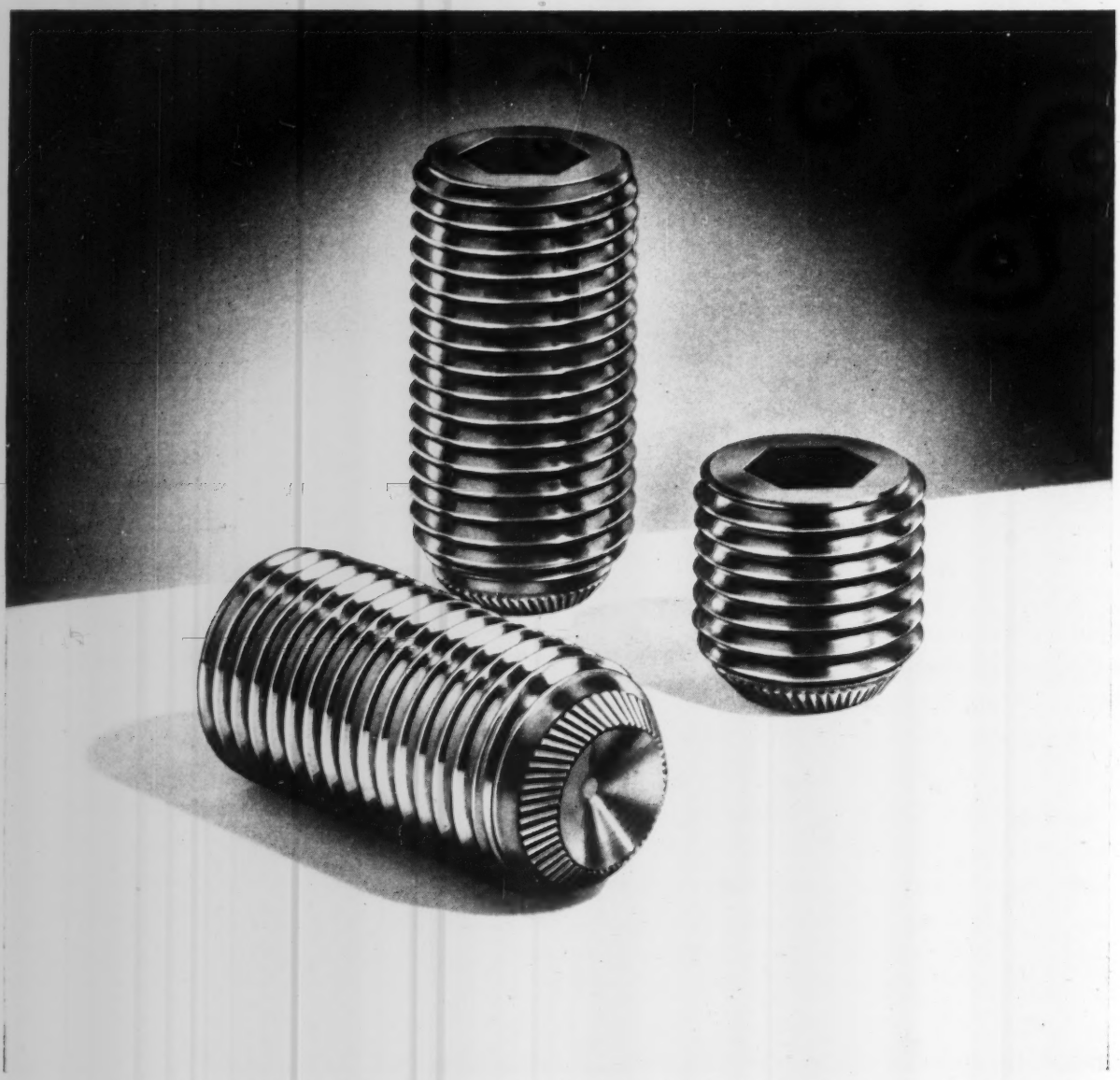
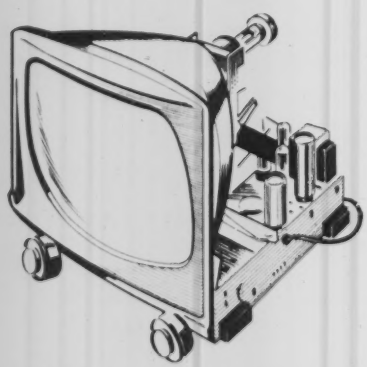


UNBRAKO SELF-LOCKING SOCKET SET SCREWS feature the following advantages: knurled cup point that won't work loose; accurate hex socket for nonslip, positive drive; fully formed threads—Class 3 fit; heat treated alloy steel for strength; standard sizes—# 4 to 1"—in a full range of lengths.



USE UNBRAKO SELF-LOCKING SOCKET SET SCREWS wherever ordinary cup point set screws are used . . . on radios, television sets and electronic equipment.

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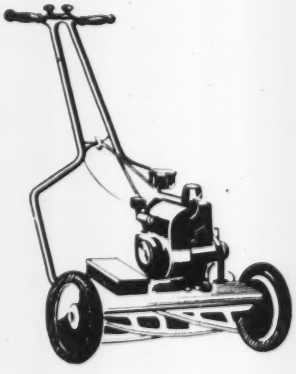
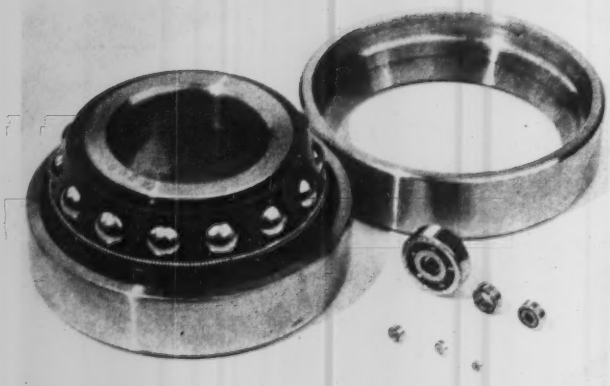
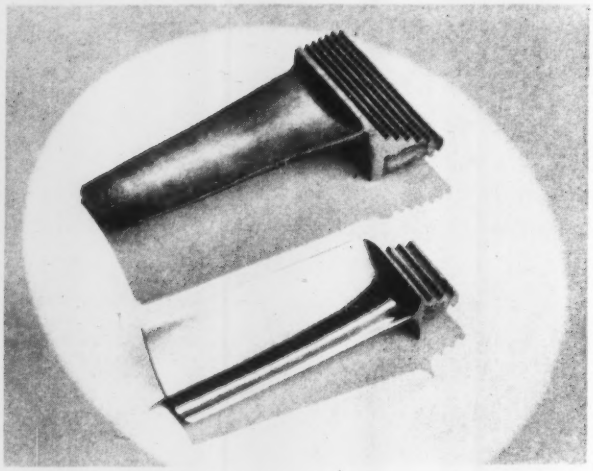


On power mowers, power saws and other power tools.

UNBRAKO Standards—as listed in the SPS Catalog—are stocked by leading industrial distributors everywhere.



Machine-tool and precision bearings made from Ferrovac-52100. Rejects are reduced, service life increased



Turbine blades forged from vacuum-cast, high temperature alloy before (bottom) and after (top) long use

Vacuum Melting Excludes Inclusions

By F. G. STROKE
National Research Corp.
Cambridge, Mass.

During process, gases and high vapor pressure elements are distilled off, and unstable oxides and non-metallic compounds are decomposed. Result: A "clean" product

VACUUM-MELTING on a commercial scale is done in high frequency induction furnaces under vacuums of one to ten microns. Metals so melted, purified and alloyed are cast into ingots that range from 5 to 1200 pounds; and during pouring, molten metal does not contact atmospheric gases, because the mold container is part of the vacuum system. So ingot metal is essentially that of the original melt.

Ingots are fabricated with particular care (usually with special techniques) to prevent contamination and loss or deterioration of unique properties.

During the vacuum-melting process, gases and high vapor pressure elements are distilled off. Unstable oxides and non-metallic compounds are decomposed. Since reactive gases are not present in the melting and casting chamber, depletion of active alloying constituents in the melt cannot take place. This prevents formation of non-metallic compounds ordinarily present as inclusions and stringers in products melted and cast in reactive atmospheres.

Control—In this manner, alloys are made with closely controlled chemical compositions; products are "clean", and in the case of ferrous heats, are low in phosphorus and sulphur.

Vacuum-cast, chromium-carbon alloy steel, similar in composition to SAE 52100 steel and free of inclusions and stringers, is being used by manufacturers of balls and races for high-quality, antifriction bearings.

Typical analysis of Ferrovac-52100 (trademark, Vacuum Metals Corp.), a vacuum-melted steel, is: Carbon, 1.01 per cent; chromium, 1.50 per cent; silicon, 0.35 per cent; manganese, 0.34 per cent; oxygen, 0.0018 per cent; nitrogen, 0.00021 per cent; phosphorus, 0.002 per cent; and sulphur, 0.003 per cent.

Applications — Clean steels of this type are of particular interest to manufacturers of small, precision instrument bearings. Rejection of finished outer and inner races after inspection of the ball track surface has been greatly reduced by use of vacuum-melted bearing steel.

Producers of larger bearings of high quality, such as spindle bearings in high precision grinding machines, also are interested in metal cleanliness. One produced a test lot of over 300 outer races, about 3½ inches OD, from a vacuum-cast alloy steel. Rejection (because of presence of small inclusions in ball track area after lapping operation) was only 3 per cent. Rejection rate of corresponding ordinary steel was many times greater.

For applications where the steel must have a superior surface finish free of inclusions, such as in

plug and ring gages and rolls, vacuum-cast metals also are being used.

Other Properties—Vacuum melting also improves fatigue properties of bearing steels. Fatigue tests on Ferrovac-52100 and a commercial SAE-52100 bearing steel (performed in a Krause rotating beam machine at the laboratories of National Research Corporation) showed a marked difference in fatigue life.

For vacuum-melted steel, number of cycles to rupture at low stresses was 100 times greater than that of conventional bearing steel.

The difference was even greater at high stress levels, with 1000 times as many cycles being required for rupture. For the same fatigue life, there was about a 50 per cent increase in permissible stress for vacuum-melted material.

Because of its improved fatigue properties, vacuum-melted steel is being evaluated for use in thrust bearings and other heavily loaded bearings, and life tests on some standard types by several of the large bearing manufacturers are in progress.

Other Materials—Exploration of fatigue properties of vacuum-cast steels has been extended to a chrome-nickel-moly steel (similar in composition to SAE-4340) that offers resistance to fatigue. It is used by aircraft manufacturers in many parts that are subjected to high alternating stresses.

It was discovered in the laboratory of a large manufacturer that there is a significant difference in the transverse fatigue properties of Ferrovac-4340 and commercial SAE 4340 steel.

Commercial steel exhibited considerably lower fatigue properties in the transverse direction from those in the longitudinal direction. Transverse properties of the vacuum-melted steel approached closely those in the longitudinal direction, tests have shown.

Composition — Close control of steel composition is, in general, beneficial from the standpoint of uniform properties from heat to heat; in some applications, composition control is of paramount importance.

For example, a vacuum-melted, iron-base, cobalt-nickel alloy, used in making glass-to-metal seals in the electronics industry, has more consistent uniform thermal expansion properties.

Because of the absence of high vapor pressure elements and nonmetallic oxides and stringers, excellent welding properties are obtained and a minimum of faulty glass-to-metal seals are produced.

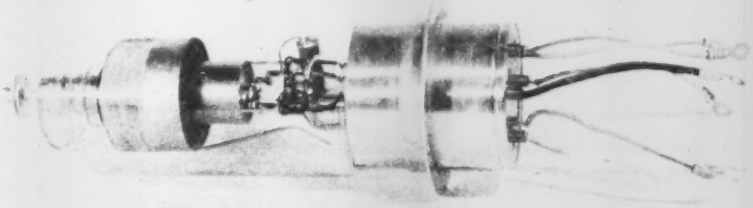
High purity iron and stainless steel also have been vacuum melted. Former is used by the electronics industry for vacuum tubes for example, klystrons and magnetrons.

Stainless steels, because of their greater cleanliness, are being evaluated by bearing manufacturers for use in stainless steel instrument bearings.

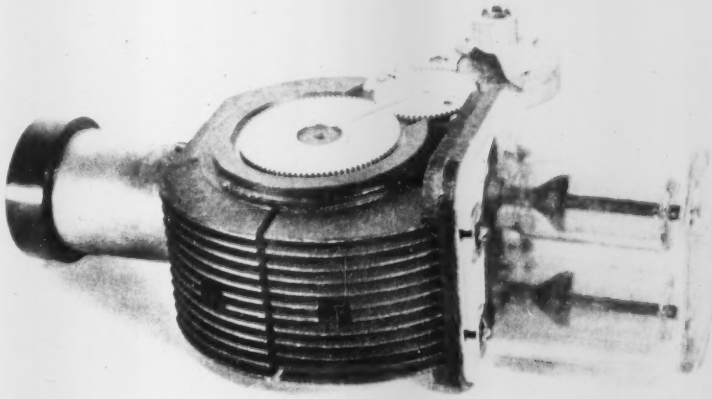
JERNKONATORET INCLUSION RATINGS

	Commercial 52100 Steel		Ferrovac-52100	
INCLUSION TYPE	THIN	THICK	THIN	THICK
A. Sulphide	Less than 1		—	—
B. Alumina	2		—	—
C. Silicate	1		—	—
D. Globular	1½	1½		

Note: Ratings were obtained by taking random samples from the bar and making a metallographic examination of the polished and unetched specimen at X100 to determine inclusion content. This follows ASTM tentatively recommended practice E45-46T.



Large hydrogen thyratron, with essential components, made from Nivac-P, a gas-free, high-purity nickel



Large magnetron, with components, made from Cuprovac. Electrical conductivity as cast is 100.5 per cent

THEY LOOK ALIKE

Cast rail and fabricated base assembly

One-piece Gray Iron rail

...but compare production costs!

GRAY IRON CHARACTERISTICS INCLUDE:

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Wear Resistance
Heat Resistance
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Vibration Absorption
Machinability

One-piece Gray Iron casting cuts machining and assembly steps

Still another manufacturer has found that one-piece Gray Iron castings lower production costs and improve product performance.

Shown above are two types of main rails along which an oxyacetylene shape cutting machine travels. One is a two-piece assembly . . . the other is all Gray Iron.

By redesigning as a one-piece Gray Iron casting, this manufacturer eliminated two machining operations and one assembly operation formerly required to make the fabricated rail. Because of the inherent dimensional stability and rigidity of Gray Iron, cutting accuracy of the machine is held to .015" over the 12' of travel.

Have you taken a good look at the cost-saving and improved performance possibilities of redesigning your fabricated parts for Gray Iron casting? Why not let us help you—write for technical information on the many advantages of the Gray Iron casting process.

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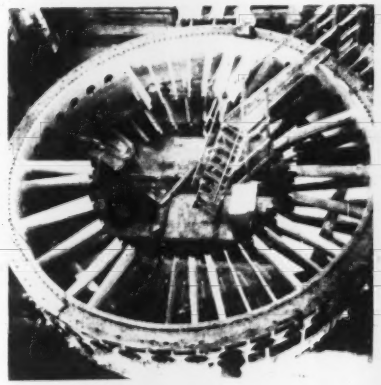
2500 mph Wind Tunnel

About 20,000 large diameter studs are applied by hand gun for compressor blade mounting

FIVE giant compressor stators, said to be the largest stud welded assemblies ever produced, are being fabricated by Westinghouse for the wind tunnel at the Air Force's Arnold Engineering Development Center, Tullahoma, Tenn.

These 26 to 34-foot diameter stators, when in place with rotors

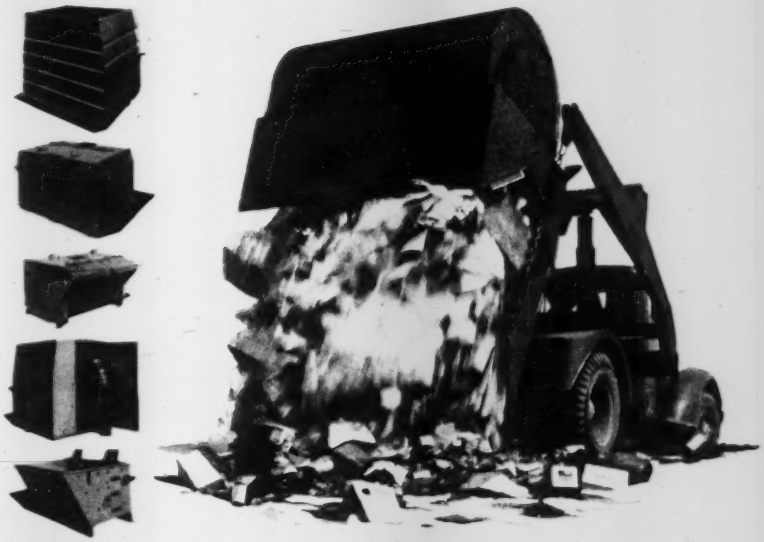


This ring is one of eleven for carrying stator blades in five compressors

Mechanic tightens a nut on one of the ¾-inch studs that secure bearing

having 216,000 connected horsepower, will produce gales of 2500 mph and more.

Each stator carries stationary blading in several rows. Each blade has a cylindrical shaft termination which is mounted in sleeve bearings housed in the



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Manufacturers over the nation have learned to eliminate the costly and inefficient method of handling bulk materials with conventional dump trucks, drivers and loading crews. You can equip one truck with a hydraulically operated Dempster-Dumpster. Then, inside or outside buildings at convenient accumulation points, you simply place detachable Dempster-Dumpster Containers, in capacities up to 4 times that of conventional dump truck bodies, with each designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. Containers shown at left, all handled by one Dempster-Dumpster, are only a few of the many available or that can be built to meet your needs. The Dempster-Dumpster, operated by only one man, the driver, serves scores of containers—one after another, as shown below.

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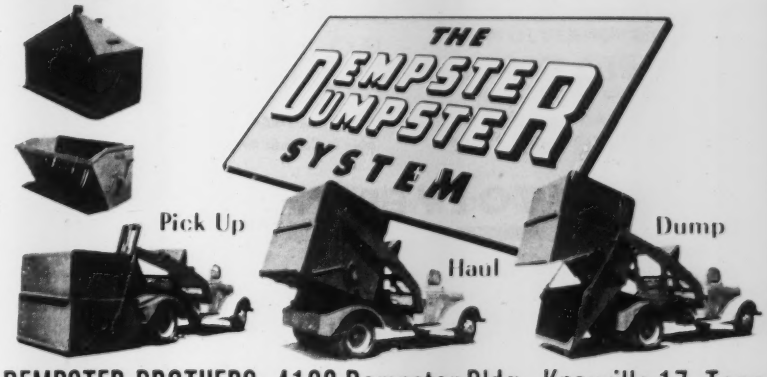
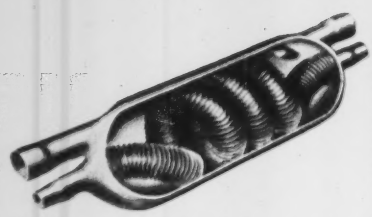
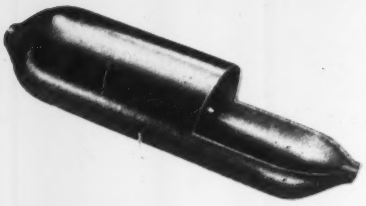


DEMPSTER BROTHERS, 4123 Dempster Bldg., Knoxville 17, Tenn.

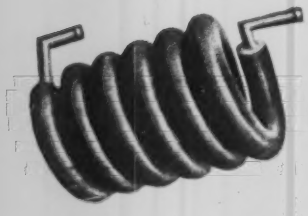
This flat pancake type coil, measuring 9" across, contains 5½ feet of Wolverine Trufin*—the integral finned tube—in its 3½ turns.

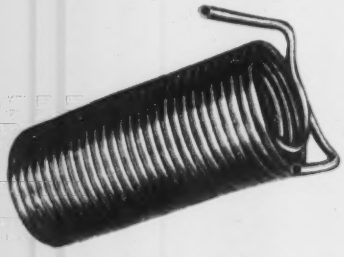


Shown here is a heat exchanger containing 25" of Wolverine Trufin* coiled within a 2½" O.D. copper shell whose ends have been reduced by the Wolverine Spun End Process†. This is a good demonstration of the ease with which Trufin can be fabricated.

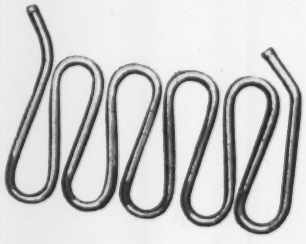


A simple form fabricated from seamless copper tube, utilizing the Wolverine Spun End† Process. By producing the part this way, you enhance its appearance—effect many economies and in most cases, eliminate "extra-part" assemblies.





The illustration on the left shows how Trufin may be coiled as easily as plain tube. Pictured to the right is one coil nested inside the other. The finished coil is approximately one foot high and 5" in diameter, the total length of the tube is 63 feet.



This shows serpentine coil to get maximum length in a small space, all on one plane. Both ends have been beaded to facilitate hose connections.

Are you about to design a Tubular Part?

In designing a tubular part, which will become a component of your main product, what will you strive for? Attractive form? Speed in production? Economy?

Wolverine can help you at every turn.

Wolverine has the skill and necessary equipment to produce nearly any tubular shape you specify—in copper, copper-base alloy, or aluminum.

In collaboration with its customers, Wolverine has designed many tubular parts which have effected increased efficiency and worthwhile savings. The product was re-designed so it could be made in a fraction of the time previously required.

Additional economy was also realized in a reduction of component parts needed, which resulted in reductions in assembly time.

You should get many helpful suggestions from our Fabricated Parts Book. We will be glad to send it to you on request.

*REG. U. S. PAT. OFF.
†A PATENTED PROCESS RE. [illegible]

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario.

WOLVERINE TUBE DIVISION
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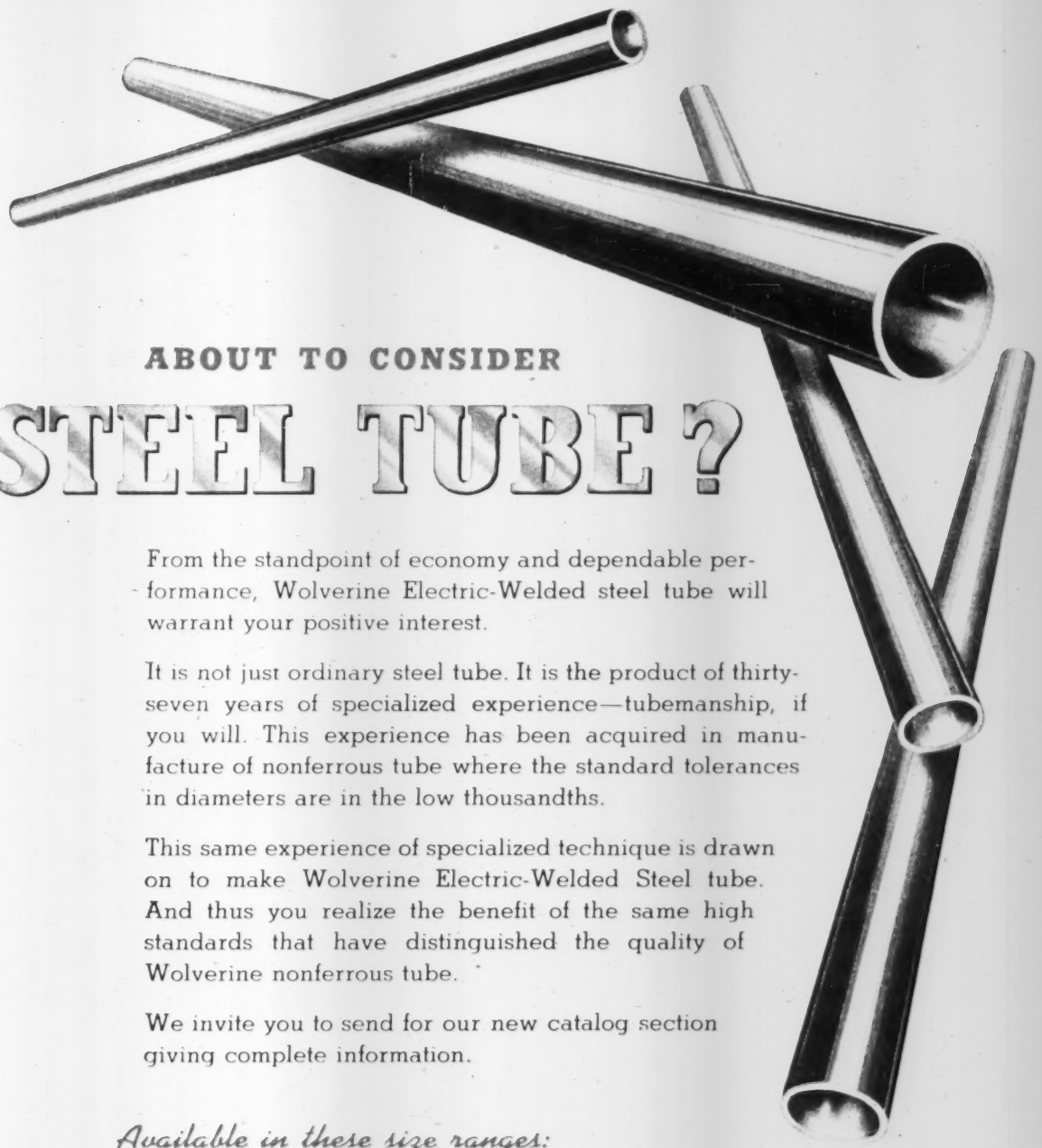

ABOUT TO CONSIDER

STEEL TUBE?

From the standpoint of economy and dependable performance, Wolverine Electric-Welded steel tube will warrant your positive interest.

It is not just ordinary steel tube. It is the product of thirty-seven years of specialized experience—tubemanship, if you will. This experience has been acquired in manufacture of nonferrous tube where the standard tolerances in diameters are in the low thousandths.

This same experience of specialized technique is drawn on to make Wolverine Electric-Welded Steel tube. And thus you realize the benefit of the same high standards that have distinguished the quality of Wolverine nonferrous tube.

We invite you to send for our new catalog section giving complete information.

Available in these size ranges:

Condenser and heat exchanger tube	½" through 2" O.D.
Boiler tube	½" through 3" O.D.
Mechanical tube	½" through 3" O.D.

WOLVERINE ELECTRIC-WELDED STEEL tube in the following analyses:
SAE 1010 SAE 1015
SAE 1020 SAE 1025 SAE 1030

ESTABLISHED 1916

WOLVERINE TUBE DIVISION
of CALUMET & HECLA, INC.

Manufacturers of Quality-Controlled Tubing

1439 CENTRAL AVENUE • DETROIT 9, MICHIGAN

Plants in Detroit, Mich. & Decatur, Ala. Sales Offices in Principal Cities

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stator ring, so blades may be rotated to adjust pitch as required during operation. Each blade bearing is in turn mounted by means of 20 Nelson studs, giving a total of about 20,000 studs for the compressors.

End Welded — The transonic compressor has 2½ x 6-foot stator blades which weigh 1000 pounds each and turn in an inner bearing mounted on the stator ring with eight ¾-inch diameter studs, and against an end plate bearing utilizing a dozen ⅝" diameter studs.

Each of the studs was applied at the pull of a Nelson stud welding gun's trigger, being permanently end welded in place with a weld strength exceeding the strength of the stud itself.

A simple template, positioned in the machined bearing holes in the ring frame, was used to locate each of the radially-disposed studs within .015-inch.

Adding Up Costs — Savings gained in substituting stud welding for conventional studs in drilled and tapped holes are in keeping with the size of the job. Total material cost for the granular flux-filled studs was less than $2000, compared with $40,000 to $50,000 which would have been required for tooling alone if drilling and tapping had been used.

Cost of split-second application of the studs was likewise only a fraction of what it would have been on a long machining job had conventional studs been used. Threaded-stud specifications would have called for a Class 5 fit, which would have required drilling, reaming, rough tapping and finish hand tapping each stud hole.

Pricing such holes at as much as $2 each, and adding cost of broken taps to tooling expense would bring savings on this project close to $100,000.

Power and control units, with hand gun, end-weld studs to compressor

Fast Threading Machine

Machine for threading a main transmission shaft with a ⅞-16 U. 2A thread 11/32" long, at a rate of 400 parts per hour, is a development of Murchey Division, Sheffield Corp., Dayton 1, O. It incorporates two "Precision-Pak" self-contained threading units, each having automatic cycling, precision lead screw, smooth, accurate spindle travel, and fast spindle return. The units are mounted on a specially constructed double welded base complete with built-in coolant pumps. They are positioned on an approximate 45-degree angle so that both can be operated at one time.

GLOBE Seamless
GLOWELD Welded

- Resistance to Corrosion
- Strength at High Temperatures
- Resistance to Oxidation at High Temperatures
- Ease of Fabrication

TYPICAL ANALYSIS AND TYPES:

302	309S	316Cb	330	410
302B	309Cb	317	347	430
304	310	321	403	443
308	314	329	405	446
309	316	INCONEL*- NICHROME**		

*Registered U. S. Trade mark.
**Trade Mark Reg. U. S. Pat. Off. D-H Co.

Globe produces more than 26 standard analyses of stainless steel tubes — also special analyses when required. Because varying analyses have widely varying service characteristics, Globe will make recommendations only after careful study of your particular problem or application.

GLOBE
specialization...
meets your exact requirements in
STAINLESS STEEL TUBES

Write for Bulletin 111 — Corrosion and Heat Resisting Steel Analysis Chart — a valuable reference tabulation of stainless steel analyses as produced by various manufacturers.

Piercing, rolling and reduction of seamless tubes is closely monitored from this control room — typical of the highly specialized equipment in the Globe mills.

SIZE RANGE:

Globe seamless stainless steel tubing — sizes ⅛ inch to 6 inches O.D., pipe sizes ⅛ inch to 6 inches, standard, extra strong and double extra strong weights.

Globe electric welded stainless steel tubing — sizes ¼ inch to 5 inches O.D. Standard weight pipe (schedule 40) sizes ⅛ inch to 2 inches — lightweight pipe (schedule 5 and 10) ⅛ inch to 12 inches.

TOLERANCE RANGE:

All stainless tubing furnished to standard A.S.T.M. specifications unless otherwise specified to suit your particular application requirements.

Globe specialization gives you uniform high quality . . .

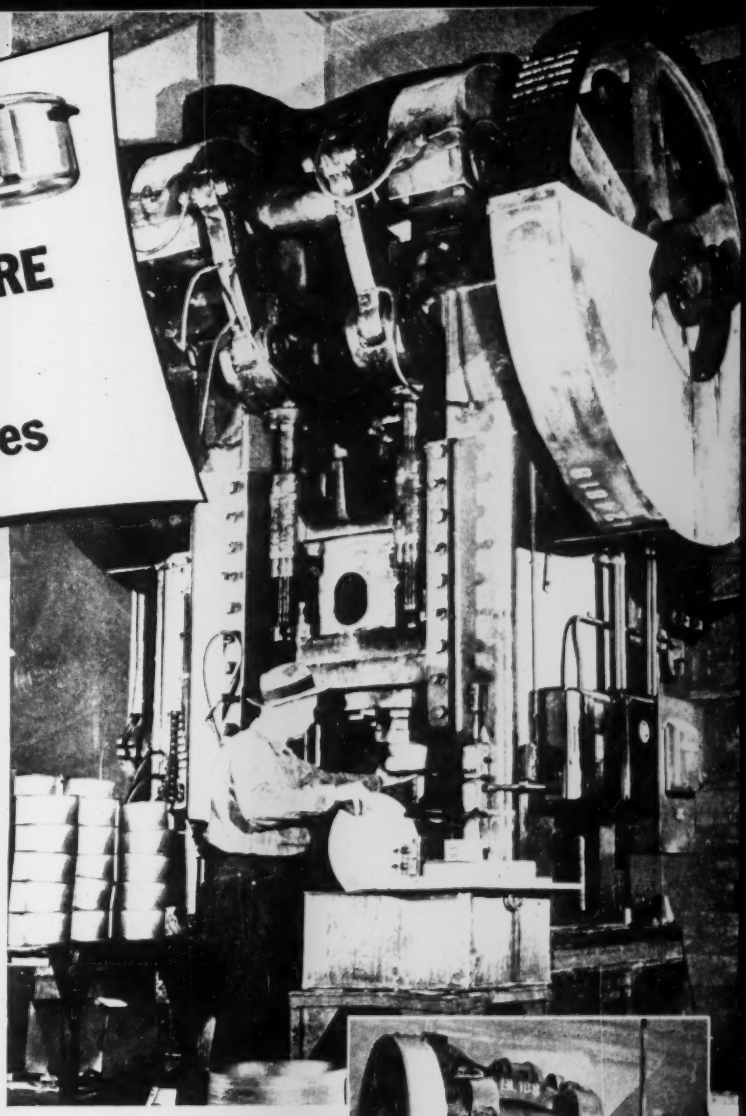
Precision checks — and re-checks — at every stage of production insure Globe stainless steel tubes that meet your exacting specifications. For more than thirty years, specialization in production of steel tubes has keynoted all Globe research, engineering and mill operations. Write for the Globe Stainless Steel Tubes catalog.

GLOBE STEEL TUBES CO.
Milwaukee 46, Wis.

Chicago • Cleveland • Detroit • New York
Philadelphia • St. Louis • Denver • Houston • San Francisco • Glendale, Cal.

Producers of Globe seamless stainless steel tubes, alloy carbon seamless steel tubes, Globeld welded stainless steel tubes — Globeron high purity ingot iron seamless tubes — Globe welding fittings.

Famous FARBERWARE is 100% BLISS in drawing presses



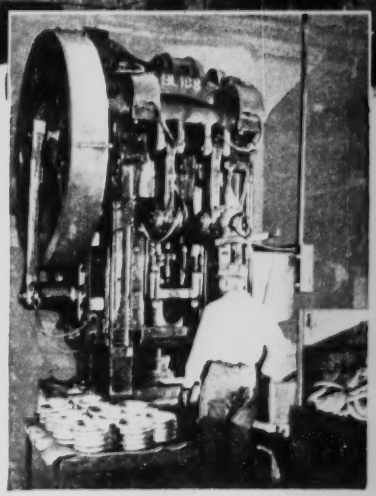
Famous Farberware begins with the finest stainless. And for dependable deep-drawing of stainless blanks, S. W. Farber, Inc. relies on Bliss toggle drawing presses—and has since 1917.

Today, the two Farberware plants are *100% Bliss* on drawing presses; *85% Bliss* on all other types.

Proven performance is the reason for this choice, of course. But here are a few of the specific operating advantages cited by H. M. Harrison, Vice President of S. W. Farber, Inc.:

1. Precision action delivers uniformly high-quality parts; keeps rejects at a minimum.
2. Bliss toggle presses are easy to set up, easy to change over; give trouble-free operation.
3. Maintenance requirements are nominal—adjustments are made quickly and easily when needed. (Floor level greasing system is a typical convenience.)

Perhaps Bliss toggle presses can solve your special deep-draw problems, too. But whatever your problems, if you're looking for high-quality, high-speed production in your press department, call a Bliss engineer. He will be glad to help you choose the *right* press for the job—mechanical or hydraulic—because Bliss makes them all.



1750 POTS IN EIGHT HOURS—that's the average production rate on this 5-S Bliss toggle. The four-quart pot is drawn 4½ inches deep in one operation from a 15-inch diameter blank of stainless.

SMOOTH BULGE on this pot cover makes it easy to clean—but calls for good press work. A rubber die is used with this 3½-B toggle press to perform this operation.

BLISS on your press is more than a name... it's a *guarantee*

E. W. BLISS COMPANY, Canton, Ohio

PRESSES, ROLLING MILLS, SPECIAL MACHINERY

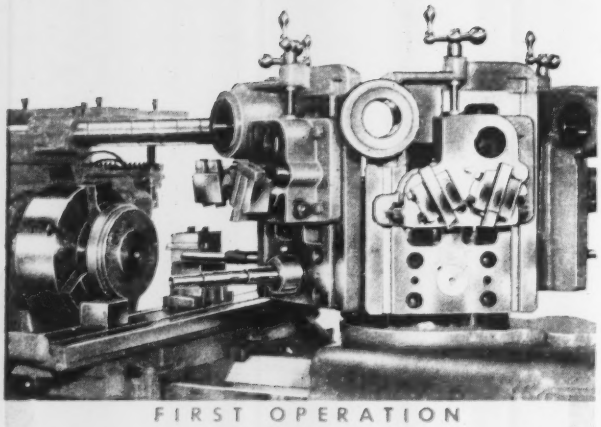
E. W. Bliss (England) Ltd., Derby, England • E. W. Bliss Company (Paris), St. Ouen sur Seine, France

U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan. *Branch Offices* in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada. *West Coast Representatives:* Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. *Other representatives throughout the world.*

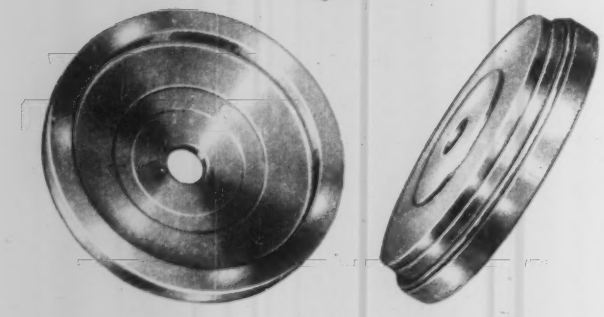
POTTER & JOHNSTON

Engineering

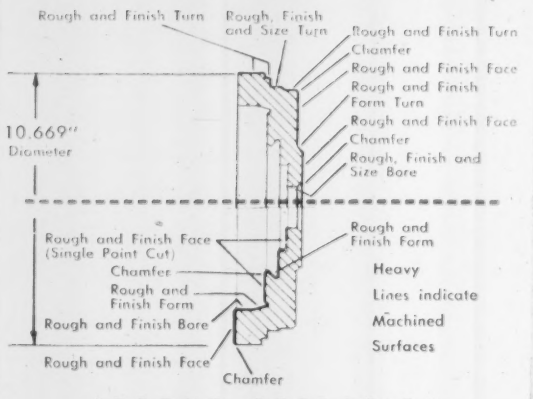
HERE PAYS OFF HERE



FIRST OPERATION



MALLEABLE IRON FLYWHEEL

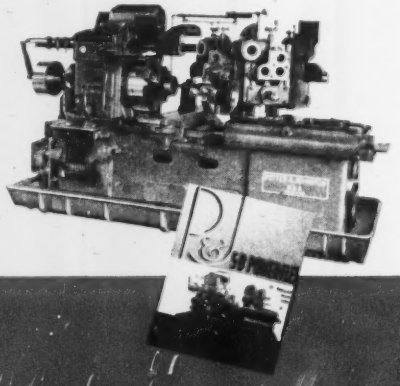


SECOND OPERATION

YOU'LL PRODUCE MORE PIECES MORE ACCURATELY at LOWER COST with P&J TOOLING on a P&J AUTOMATIC

Tooling expertly engineered to the job by Potter & Johnston Specialists assures the best possible combination of machining operations and sequence for fast, accurate, low cost production. Unnecessary handling is eliminated; combined cuts minimize machining time. And when P&J Tooling is put to work on an accurate, powerful, versatile P&J Automatic Turret Lathe — like the 5D Power-Flex shown here — the result is really profitable production on even your toughest jobs.

For complete information, send today for your copy of the 5D Power-Flex Bulletin No. 131 — and ask the P&J Tooling Engineers to submit recommendations based on your prints or sample parts.



POTTER & JOHNSTON CO.

PAWTUCKET, RHODE ISLAND

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EXPORT DEPT., PAWTUCKET, R. I.

AGENTS: DALLAS, THE STANCO CO.
HOUSTON, WESSENDORFF, HELMS & CO.

NEW PRODUCTS and equipment

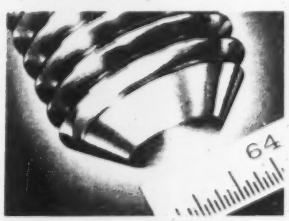
Reply card on page 153 will bring you more information on any new products and equipment in this issue

Improved Screw Points

. . . high shaft holding power

Smaller cup point for set screws will replace A.S.A. cup point set screws in the manufacturer's standard line. Company reports greater locking at all measured installation, uniformly high shaft holding power, excellent performance under vibration and more complete shaft contact pattern. Screw is available in Allenoy and stainless steel, with NC or NF threads.

In addition, an unthreaded leader point has been developed for the



company's cap screws, designed to reduce cause of thread injury and damage to threaded holes. Allen Mfg. Co., Dept. ST, 113 Sheldon St., Hartford, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO 1

Telescopic Mast Attachment

. . . cuts down load transfer

Double telescopic mast can be drastically lowered for working in low-ceilinged areas or extended for high stacking in other areas. It is developed for use on the manufacturer's trucks, making it possible for the same truck to be used in both boxcars and high-stacking storage areas. Result is elimination of a second truck and time consumed in transferring loads from one to the other.

Attachment consists of two short masts, the first mounted in conventional position, the second in place of the carriage. Carriage

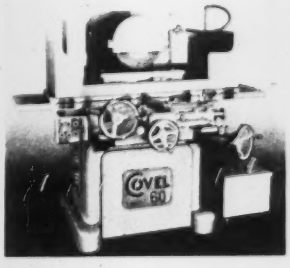
and forks, in turn, are mounted on the second mast. Both can be operated independently or simultaneously. Towmotor Corp., Dept. ST, 1226 E. 152nd St., Cleveland 10, O.

FOR MORE DATA—CIRCLE REPLY CARD NO 2

Precision Surface Grinder

. . . 14 x 24-inch work surface

Model 60 precision surface grinder has 14 x 24-inch work sur-



face, 15-inch width of cross feed, 27-inch table travel and more than 18-inch vertical work capacity. It is built for grinding trim and mold dies, plastic molding and forming dies, form and cutoff tools. Table travel is 10 to 90 fpm.

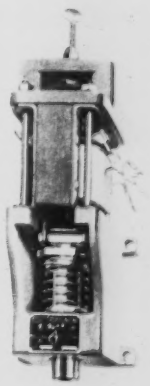
Rugged construction allows heavy cuts and holds down grinding time. Elevating handwheel is located below table level for convenience. Other features include built-in wheel truing device, closed hydraulic circuit, complete dust protection, powered elevation and automatic lubrication. Covel Mfg. Co., Dept. ST, Benton Harbor, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO 3

Electric Impact Hammer

. . . impacts to 3500 pounds

This compact electric impact hammer is a packaged unit suitable for fixed single-purpose applications where controlled impacts up



to 3500 pounds are required. It is well suited for use in larger machines where a specified blow or impact is desired.

Called Electropunch Jr., the versatile hammer lends itself to automatic, semiautomatic and manual operations — particularly for staking, riveting, marking, cutting,

"MULTI-CUT" "TUFCUT" "HOT WORK"

Wapakoneta
SHEAR BLADES
and
ROTARY KNIVES

Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.

Rx ENGINEERED TO THE JOB

Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

The WAPAKONETA MACHINE CO.
Shear Blade Specialists Since 1891
Wapakoneta, Ohio

NEW PRODUCTS and equipment

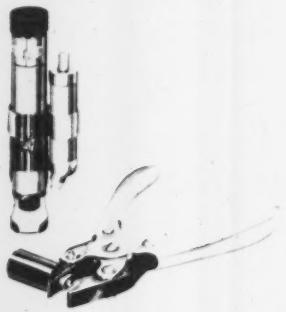
blanking, forming and drawing. It combines a solenoid with a mounted ram to deliver accurate, controlled blows, operating continuously at a rate of more than 100 blows per minute. Black & Webster Inc., Dept. 87, 445 Watertown St., Newton 58, Mass.

FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Sheet Metal Hardness Tester

. . . sheets 0.010 to 0.250-inch

Hardness tester model 317 employs calibrated microscope and reticle to get readings on all types of sheet metal, ferrous and nonferrous. Readings can be obtained as accurate as operator can read the scale well within two points in the Brinell scale. The microscope has self-contained battery-type illuminator.



The portable tester can measure sheets from 0.010 to 0.250-inch. It operates by using a 1/8-inch ball with 150 KG load. Readings in the scale are direct. Pacific Transducer Corp. Dept. ST, 11921 W. Pico Blvd., Los Angeles 64, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Engine Lathe Line

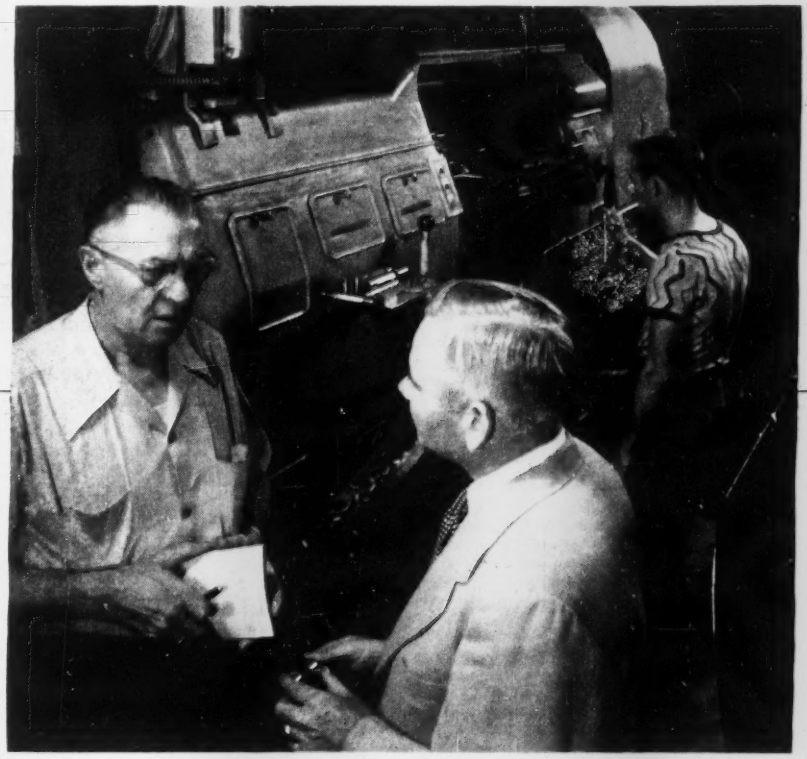
. . . in 13, 16 and 20-inch sizes

Precision performance under continuous, heavy-duty service conditions characterizes this series 61 engine and toolmaker's lathe line. Models are available in 13, 16 and 20-inch sizes. They incorporate, in a full range of swings, built-in apron-controlled power rapid traverse to carriage and cross slide. Effects are rapid tool positioning, quick retraction and fast carriage return, achieving a reported tool adjustment time reduction of about 50 per cent.

Longitudinal movement, right or

"with **GULF LASUPAR CUTTING OIL** we get better finishes, longer tool life on B-1113 steel parts"

says Guy Hack, Holt Products Co., Holt, Mich.



"Gulf Lasupar is the ideal cutting oil for high production-close tolerance work on automatics," says Mr. Hack. "Not only do we get longer tool life and better finishes, but we have found that this quality cutting oil provides corrosion-free lubrication of machine bearings."

Send the coupon below for a copy of the pamphlet "Gulf Lasupar Cutting Oil," which gives all the facts on how this outstanding cutting fluid can help you improve your machining practice.

GULF SERVES INDUSTRY

Gulf Oil Corporation · Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, a copy of your pamphlet, "Gulf Lasupar Cutting Oil."

Name

Company

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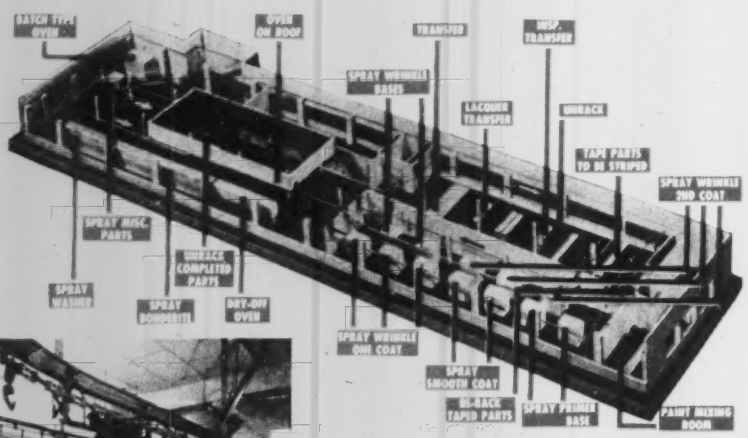
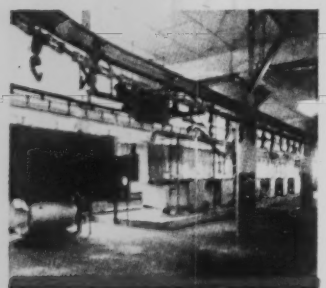
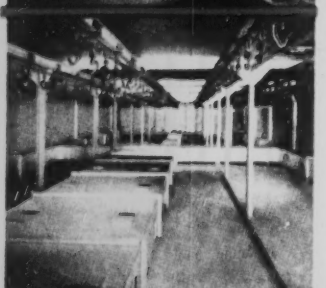
Complete Paint Finishing Systems Designed and Engineered for Your Specific Needs by P-D







Peters-Dalton has a long established reputation for properly designing and skillfully engineering the units of finishing systems and fitting them into high-production and economical operations.

P-D leadership in the design and manufacture of highly specialized modern paint finishing systems is the result of 25 years experience in a wide range of industries. P-D's recognized facilities and engineering techniques can help solve the problems offered by installations in new or expanding plants. We'll gladly tell you more if you . . . Write, Wire or Phone.

METAL PREPARATION

Operating on a conveyor, metal parts washers are designed by Peters-Dalton to remove all kinds and amounts of dirt sticking to parts. We are a recognized authority on washers that both clean and deposit a bonding or rust-proofing film used before a paint operation.

SPRAY PAINTING

In addition to reducing fire hazards, we emphasize that spray booths should be designed around the part and output volume to effectively eliminate paint overspray.

BAKING and DRYING

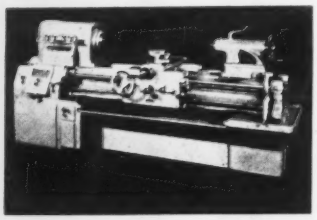
Peters-Dalton designs and manufactures all types and sizes of ovens, including core, dehydration, curing, and special purpose units for direct or indirect gas or oil firing.

- Hydro-Whirl Pass Spray Booths
- Industrial Washing Equipment
- Drying and Baking Ovens
- Hydro-Whirl Dust Collecting Systems

P-D Peters-Dalton INC.
17892 Ryan Road • Detroit 12, Michigan

NEW PRODUCTS and equipment

left, is 160 ipm; cross movement, in or out, 75 ipm. Safety clutch is



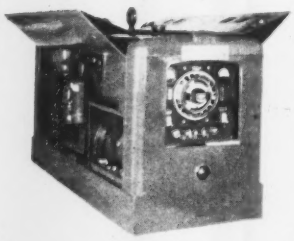
provided for all traverse movements. Direct-length reading dial facilitates multiple diameter turning and blind hole boring. Monarch Machine Tool Co., Dept. ST, Sidney, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Diesel Engine-Driven Welder

. . . has 300-amp capacity

This 300-amp capacity diesel engine driven arc welder is designed for locations where electric power is unavailable. The General Motors two-cycle unit injection diesel has piston displacement of 141.8



cu in. and is rated at 67 hp at 1500 rpm.

Control arrangement permits operator to make fine voltage-ampere adjustment at the work, eliminating unnecessary steps from work to machine. Its 1000 combinations of voltage and ampere adjustment correct arc intensity selection to

(Continued on p. 159)

USE A REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

TEAR OUT CARD, FILL IN and MAIL TODAY

56. Drawing Brass

American Brass Co.—12-page illustrated bulletin B-39 describes Formbrite drawing brass. Material has high ductility and strength and draws to a high finish. Physical properties are listed and fabrication data are given.

57. Stamping Specialties

Whitehead Stamping Co.—Washers, stampings and stamped specialties are covered in 20-page illustrated bulletin. Specialties include mirrors for automotive use with fixtures, also card or label holders. Complete data are given on available size ranges as well as contract production facilities.

58. Atmosphere Batch Furnace

Surface Combustion Corp.—Features of standard and heavy duty sizes of Allease batch type controlled atmosphere furnace are described in 6-page bulletin SC-163. Heated by radiant tubes, it is equipped with a recirculating fan and enclosed quench. Construction drawings and photos of typical applications are included.

59. Soaking Pit Cranes

Morgan Engineering Co.—20-page bulletin 32-A contains series of photographs showing construction features and installations of Morgan soaking pit cranes. General description of units is included.

60. Rustproof Wrapping Paper

Nox-Rust Chemical Corp.—"Wrap Out Rust with Nox-Rust Vapor-Wrapper" is title and subject of 16-page illustrated brochure which tells all about the chemically active paper that blocks rust in one operation. What it is and how it works is related, and case histories point up its advantages.

61. Nonferrous Forgings

Mueller Brass Co.—32-page illustrated catalog H-58565 contains much general data on brass, bronze and aluminum forgings which possess high tensile strength, high density, low porosity, light weight and corrosion resistance. Properties, design factors, machining data, typical shapes and much other general data are found in it.

62. Graphite Pipe & Fittings

National Carbon Co.—Karbate impervious graphite pipe and fittings are subject of 16-page illustrated catalog section S-7000. Specifications, cross sectional drawings, applications and properties are presented.

63. Cut Wire Shot

Metals Disintegrating Co., Harrison Abrasive Div.—"Cut Wire Shot, Its Development and Use" is a technical article which presents the history, applications, manufacturing processes, properties and much other data on this abrasive.

64. Pneumatic Vibrators

Cleveland Vibrator Co.—Diversified line of pneumatic vibrators is described and illustrated in this 16-page catalog, identified as 109. Units for wide variety of applications have their specifications given and their uses shown. Engineering data sheet and prices are included.

65. Phosphate Coatings

Detrex Corp.—How the 701 phosphate coating for immersion application and 702 coating for spray application can serve to retard corrosion and provide a good paint base are told in 8-page illustrated booklet 206-4. Details of the processes are given.

66. Forging & Upsetting Dies

Ajax Mfg. Co.—"Design of Dies for Upsetting & Forging Machines" is a well-illustrated brochure of 32 pages which could serve as a text on the subject. Photos show many of the design features and techniques.

12-14-53

STEEL
Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

1	11	21	31	41	51	61	71	81
2	12	22	32	42	52	62	72	82
3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
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Cleveland 13, Ohio

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67. Control Valves

C. B. Hunt & Son, Inc.—12-page illustrated bulletin 531 describes Quick-As-Wink air and hydraulic control valves and couplings. Air valves are of sliding sleeve and plunger types for pressures up to 300 psi. Hydraulic valves are available for service to 5000 psi. Bulletin shows operation and lists sizes, actions and applications.

68. Hydraulic Components

Hydraulic Press Mfg. Co., Hydraulic Power Div.—Complete engineering data on more than 800 basic hydraulic cylinder models are given in one of nine catalogs now available dealing with hydraulic components. From this set of literature, an engineer can lay out a hydraulic circuit to meet almost any requirement.

69. Precision Cranes

Harnischfeger Corp.—24-page illustrated bulletin C6-3 shows a wide variety of installations of industrial cranes. Important features of each type are explained, and complete specifications are also given.

70. Thread Milling Machines

James Coulter Machine Co.—Thread milling machines of hob and universal types are covered in two illustrated bulletins. Universal machine has 59 spindle speeds and mills threads from 1¼ to 20 per inch and leads from 0.05 to 5.5 in. Both machines, the Threadmaster and the H1, are completely described with all specs.

71. Steel Weldments

Avery & Saul Co.—16-page pictorial style brochure depicts company facilities for fabricating steel plate weldments, taking the reader on a plant tour from stockyard to finished product. Typical examples of finished work are shown.

72. Vaneaxial Blowers

Hartzell Propeller Fan Co.—Direct-drive vaneaxial, belt-drive vaneaxial and special portable blowers for exhausting fumes from tanks are covered in 16-page bulletin A-110. Two of the belt-drive models, a high-temperature blower and a new design for low volume, high pressure needs, are new lines being introduced for the first time.

73. Dicing Machines

Burbart Mfg. Co., Henry & Wright Div.—60-page illustrated catalog 53 describes the construction features, operating details and attachments for complete line of Henry & Wright dicing machines. Complete specifications and much general data are included, along with information on stacking chutes, power straightener and reel and Dheometer.

74. Milling Cutters

DoALL Co.—Among the variety of milling machine cutters described in 16-page form 51-806 are slitting saws, screw slotting saws, shell end mills, keyseat cutters, T-slot cutters and counterbores. End mill holders and arbors are listed also. Recommended starting feeds and speeds are provided as well.

75. Precision Metal Balls

Coolidge Corp.—A specification chart for chrome alloy steel and stainless steel balls, including grades and guaranteed hardness data is featured in 4-page catalog. Material information on special requirements for extreme high speed or high temperature applications is provided.

76. Auxiliary Mill Equipment

Lake Erie Engineering Corp.—Company's expanded facilities for design and manufacture of rolling mill auxiliary equipment for both ferrous and nonferrous mills are outlined in 4-page bulletin 50-1.

77. Universal Testing Machine

Baldwin-Lima-Hamilton Corp.—The Baldwin-Emery SJt-4 universal testing machine of 50,000-lb capacity is described in 8-page illustrated bulletin 4206. Novel weighing system, construction and automatic operation, as well as unit's unusual multiplicity of uses are presented.

78. Furnace & Oven Control

Bristol Co.—Expanded 48-page catalog P1260 on complete control systems for furnaces, ovens, dryers and kilns contains the engineering specifications and prices necessary to choose and order a proper control "package". Potentiometer and millivoltmeter type pyrometer controllers, recorders and indicators, as well as bulb-and-tubing recording or controlling thermometers are described and pictured.

79. Stampings & Washers

Whitehead Stamping Co.—Stampings, washers and specialties are sized and specified in 16-page brochure 1578 published in celebration of company's 50th anniversary. Plain

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flat washers, special machinery washers and plugs, tubing and wire cable clips, felt retainers or cup washers and standard card or label holders are covered. Whitehead Stamping

80. Wire Rope Slings

H. K. Porter Co., Leschen Wire Rope Div.—"New Ideas in Red-Strand Slings" is title of folder describing various multiple and single-part slings, thimbles, grommet-swaged fittings and grommet slings. Cost savings are illustrated.

81. Bearing Lubrication

U. S. Electrical Motors, Inc.—Comparisons of methods for lubricating electrical motors are made in 8-page illustrated bulletin 1848. The advantages of Lubriflush full-lubricant flow types are depicted in comparison with cartridge and standard open units.

82. Wet Blasting

American Metaseal Mfg. Corp.—4-page bulletin illustrates how controlled surface finishing of metal parts is performed by the Metablast wet finishing process and equipment. Before and after views of various parts are shown, along with illustration and description of the machine.

83. Scrap Grapples

Owen Bucket Co.—Scrap grapples with tine openings ranging from 5 ft 11 in. to 9 ft 4 in. are covered in 12-page illustrated bulletin S-075303. Two tine designs make possible use with all sorts of scrap iron. Comparative test results illustrate tonnage per hour increases possible with the equipment.

84. 70-Ton Locomotive

General Electric Co.—70-ton, 600-hp "Middleweight Champion" diesel-electric locomotive is described in 16-page illustrated bulletin GEA-4657B. Various features, including power plant, drive, controls, swivel trucks and other important components are fully described. Maximum starting tractive effort is 41,700 lb.

85. Oil & Gas Burners

Hauck Mfg. Co.—28-page illustrated catalog 1043C gives details of oil and gas burners, torches and heaters for such purposes as cupola lighting, mold drying, ladle heating, core baking and furnace heating. Complete specs and descriptions are given for a wide range of equipment and accessories.

86. Indexing Devices

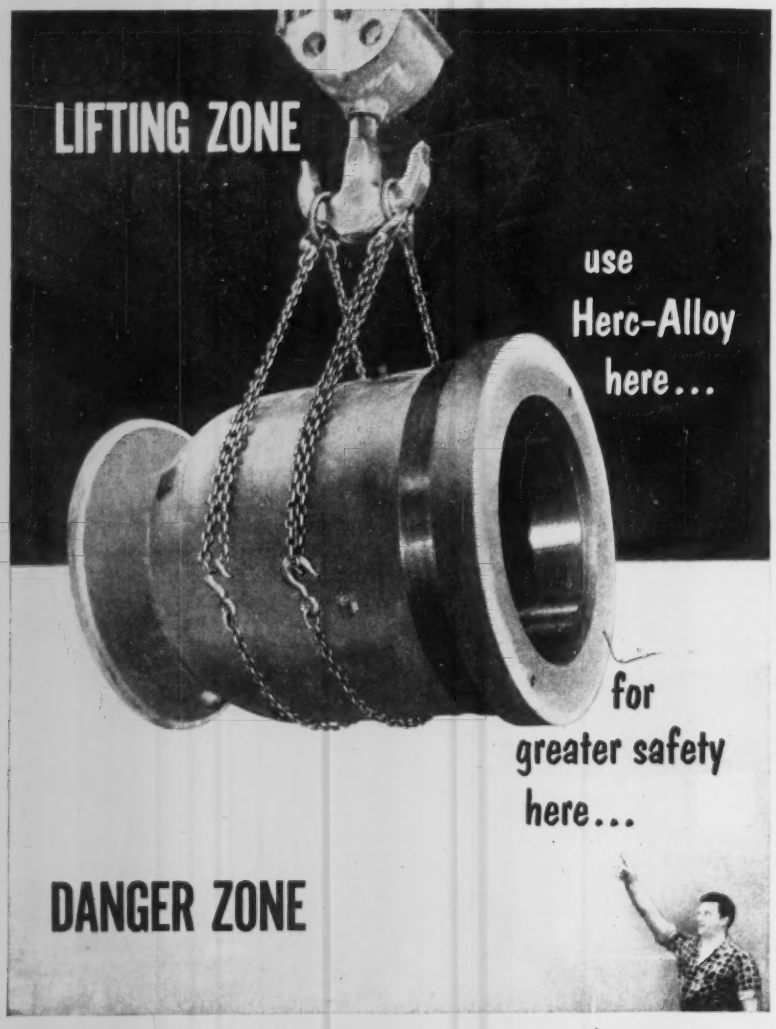
Hartford Special Machinery Co.—12-page illustrated bulletin S-103 covers Super Spacer indexing devices

for a fabulous finish...

JEWEL BRAND
Abrasive Belts

for grinding, sanding, polishing — metal, wood, leather, plastics, rubber.

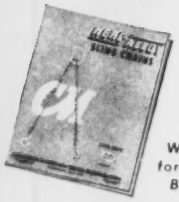
ABRASIVE PRODUCTS, INC.
511 Pearl Street
South Braintree 85, Massachusetts



SPECIFY

HERC-ALLOY

SLING CHAINS



Write for Data Book

HERC-ALLOY Sling Chains are made-up to order, are individually tested, registered and guaranteed

Hundreds of plants like the one shown above* are using Herc-Alloy Sling Chains. Greater safety is their big reason for doing it. But there are other factors too. Herc-Alloy is economical because of its long service life. Then too, the use of alloy steel permits a weight reduction that helps prevent worker fatigue. These advantages are worth thinking about. Those who do consider them seriously generally adopt safe Herc-Alloy Sling Chains for their plants.

CM HOISTS AND CHAIN

COLUMBUS McKINNON

CHAIN CORPORATION

TONAWANDA, NEW YORK

DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND

In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

in 8 and 12-in. table diameter sizes which are used instead of jigs and fixtures for spaced drilling, milling, grinding, boring, planing, etc. Companion bulletin E-201 shows company facilities for contract metalworking, giving machines available and detailing standard products.

EDITORIAL ARTICLES

Available in Limited Quantities

87. Plated Coatings

Present ample tin supply is leading designers to examine more closely its potential as an alloying constituent. Success is seen with lead, zinc, nickel, copper and cadmium. Dr. F. A. Lowenheim of Metal & Thermit Corp. discusses the possibilities of tin as an alloying constituent to improve electroplated coatings in STEEL article "Plated Coatings . . . Designers Weigh Tin Alloys."

88. Atomic Power

In STEEL article "Atomic Power Latch String Is Out," Technical Editor Dr. A. G. Gray points out that there will be the same hum of turbines and generators using heat from atomic fission as from other sources of heat energy. Industry will also be able to help with materials and components for the firebox.

89. Your Safety Program

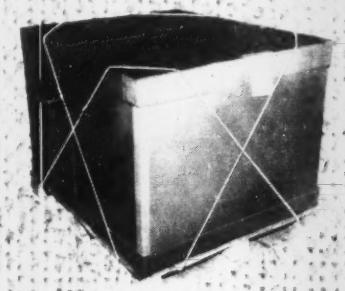
Hit and miss knowledge of safety devices in stamping plant can be costly. Aside from proper equipment, management must supply operators with all available information. STEEL article "What About Your Safety Program" by Associate Editor H. Chandler describes various guards and safety devices and features a punch press inspection chart.

90. Modern Spectrography

The economics of composition control in metals puts greater emphasis on speed. Fast analysis means costly equipment but the savings will more than meet the payments. This factor is effectively discussed in STEEL article "Modern Spectrography . . . Speed Pays High Cost of Knowing."

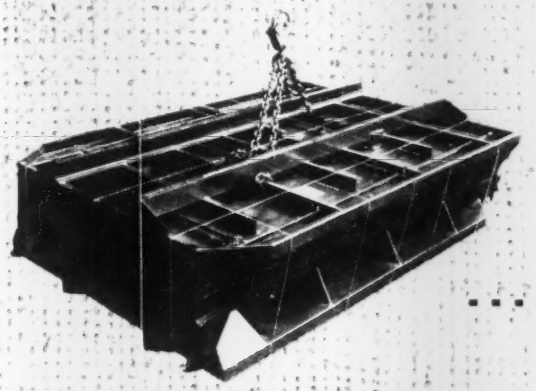
TO GET LITERATURE . . . reviewed in this column, circle corresponding item number on reply card found in literature insert.

FOR *Job-tailored* STEEL STRAPPING CALL GERRARD



• U·S·S Gerrard Steel Strapping is really made to fit the job. Whether you're reinforcing a parcel post package or a ponderous pallet of machine parts, there's a Gerrard tie in the size and type you need.

ROUND . . .

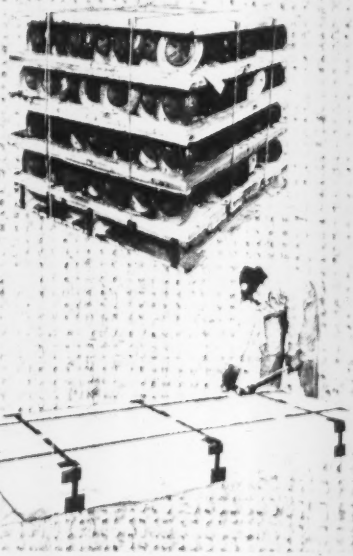


Gerrard's Round Steel Strapping is available in a complete range of sizes. The shape of the bundle doesn't affect the reinforcing, since dimensionally uniform Round Strapping conforms perfectly to irregular contours.

Both the hand-operated machines and the semi-automatic Q Model apply Gerrard's "twist knot" to Round Strapping.

And Gerrard Round Strapping costs about 40% less than any other metal reinforcement.

. . . OR FLAT



Gerrard Flat Steel Strapping is also made in a wide range of sizes, excellent for palletizing, unitizing, crating, and other heavy duty tying.

Easy-to-operate Gerrard Flat Strapping stretchers and sealers do the job quickly and efficiently—keep the bundle compact until it reaches its destination.

Make Gerrard your *one* source of supply for both Round and Flat Steel Strapping. You'll save in freight charges by combining shipments of both types of strapping in a single carrier. You'll save time and simplify your paper work too, by using a single purchase order for all your strapping.

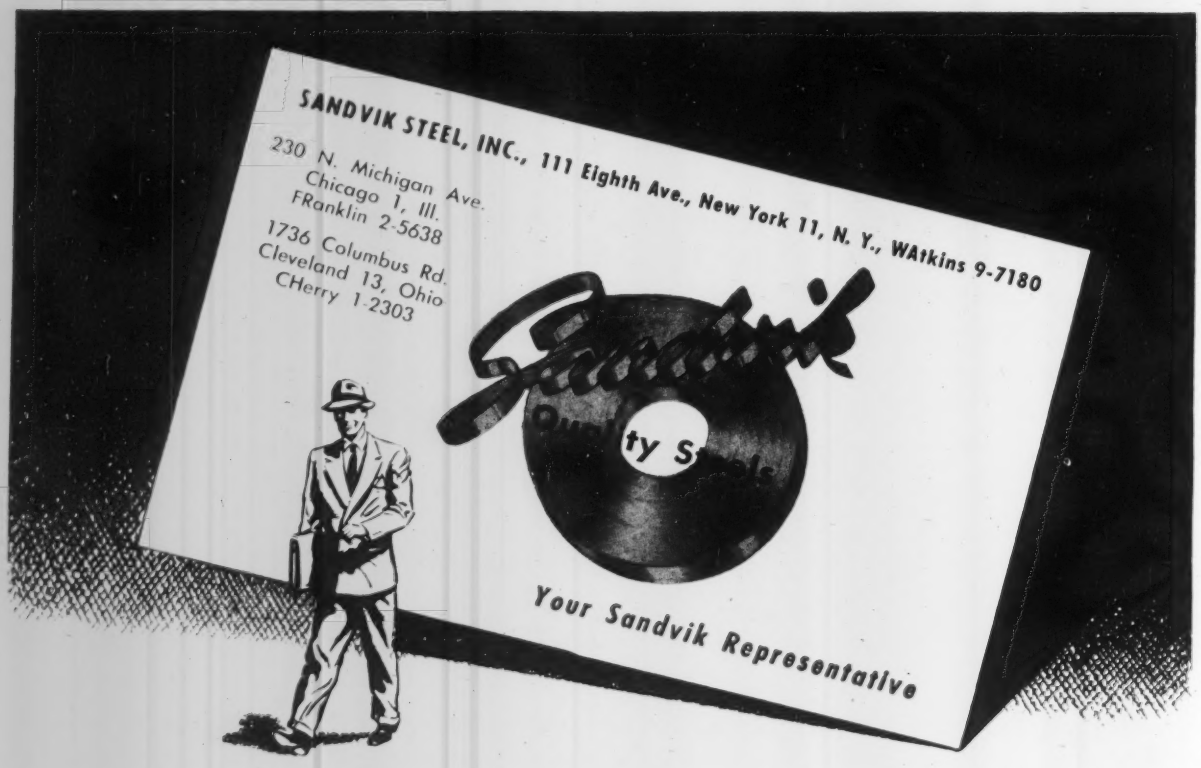
Contact a Gerrard engineer, soon. He'll be glad to give you a complete rundown on the specific applications of Gerrard Steel Strapping. If you wish, he'll advise you, free of charge, about the tying method best suited to solve your production problem—safely and economically. Send for your free copy of the *Blue Book of Packaging*.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
4745 South Richmond St., Chicago 32, Ill.

U·S·S GERRARD

Round Steel **STRAPPING** *Flat Steel*

UNITED STATES STEEL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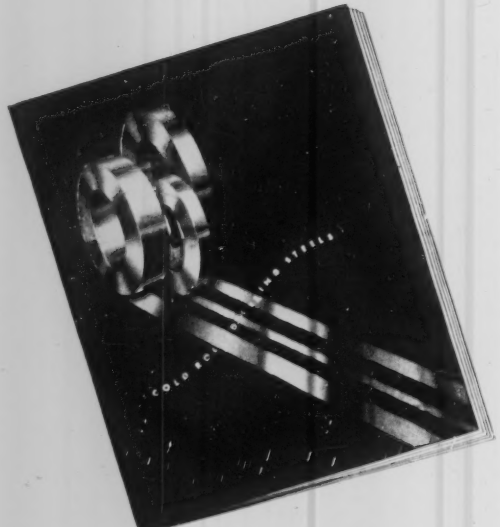
ASK THIS EXPERT . . .

to help you solve your spring steel problem



DO YOU HAVE YOUR COPY OF THIS FREE, NEW SANDVIK CATALOG?

Catalogues 785 sizes. Gives thickness, width, hardness, types of edges and weight in pounds per hundred feet. Also useful conversion tables. Write, on your letterhead today.

The next time you have a problem in spring steel, call your Sandvik representative. Through experience, he has learned what the requirements of many specific spring steel applications are.

Tell him about your problem and, chances are, he can advise you as to which type of steel will best fit the job. His technical knowledge and practical experience are yours for the asking.

Furthermore, there are 785 chances that he can give you the exact type and size of steel you need, right "out of the bin." Sandvik strip steel stocks include approximately 652 cold-rolled, hardened and tempered sizes and 133 cold-rolled and bright annealed sizes.

Sandvik high quality spring steels are available:

- **In straight carbon and alloy grades**
- **In special analyses for specific applications**
- **Annealed, unannealed or hardened and tempered**
- **In thicknesses from .00?"**
- **In a wide range of widths**
- **Polished bright, yellow or blue**
- **With round or square edges**

Phone, write or wire your nearest Sandvik office for further information or technical help.

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NEW PRODUCTS and equipment

Continued from p. 152

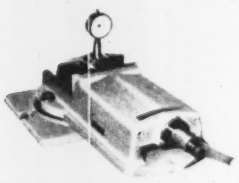
suit any job. Other features include separate excitation and two-way ventilation. Hobart Brothers Co., Dept. DW, Hobart Square, Troy, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Hydraulic Vise

. . . no pump, hoses, tubes

High-precision self-contained hydraulic vise has no pump, hoses, tubes or connections. It combines elements of mechanical operation with those of hydraulic power transmission. When vise handle is turned clockwise, jaws close mechanically until clamped object is met. At that point, clutch



automatically is activated and additional force applied hydraulically.

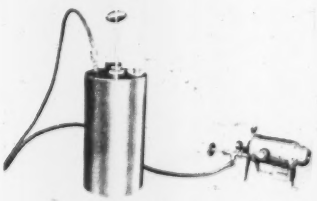
Up to 8750 pounds can be applied with what amounts to finger-tip control. Once hydraulic system goes into action, movable jaw will advance only 1/32-inch. Result is elimination of crushed work—even such items as thin-walled castings. American Tooling Corp., Dept. ST, 60 E. 42nd St., New York, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Preheating Blow Torch

. . . starts at low temperatures

Model E75 Super Jet blow torch preheats its own combustion air, enabling it to be started at extremely low temperatures. Separate fuel tank that supplies fuel to the torch under low pressure—45 psi



eliminates fire hazard, allows use of any size tank and any length of all-metal hose. Cylindrical fuel tank supplied is ½-gallon capacity,

need a finish
that blocks corrosion by itself—or under paint? specify IRIDITE

You can solve any problem of non-ferrous finishing . . . maximum corrosion protection . . . sparkling clear or colored decorative finishes, firm and lasting base for paint . . . with these two words "specify Iridite". For example—

- **ON ZINC AND CADMIUM** you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.
- **ON COPPER . . .** Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.
- **ON ALUMINUM** Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.
- **ON MAGNESIUM** Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

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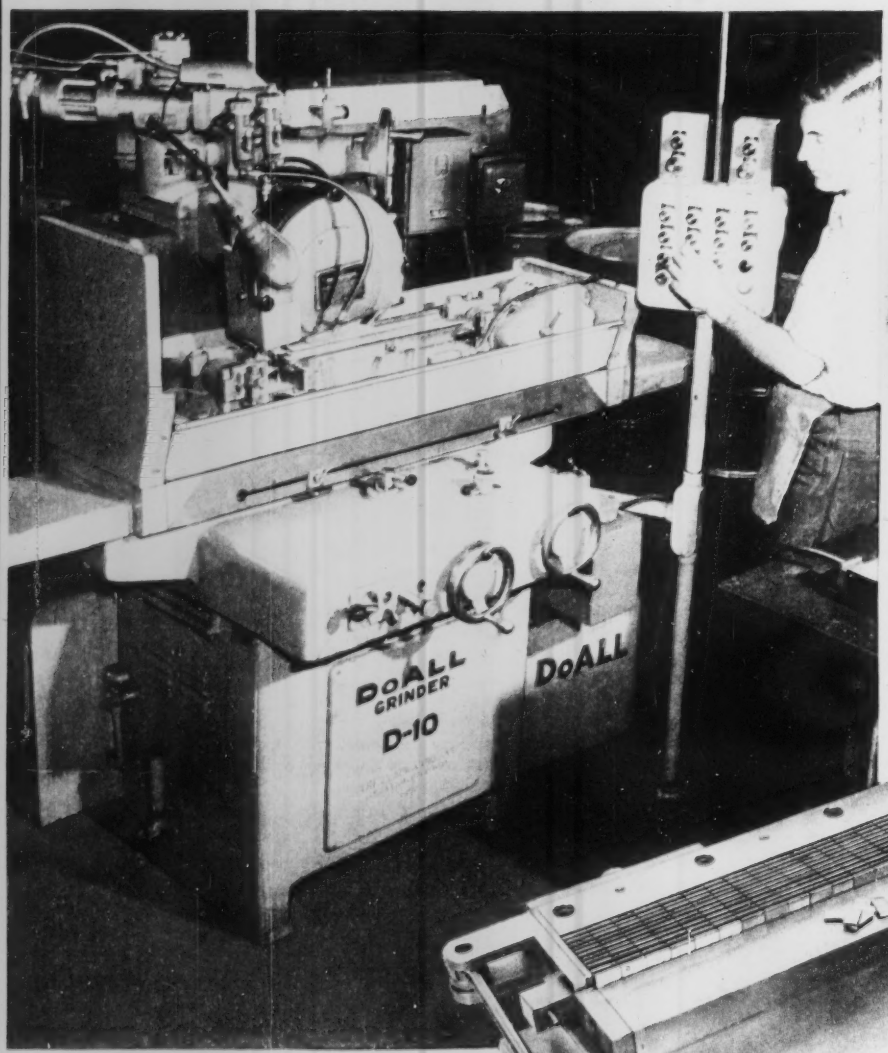
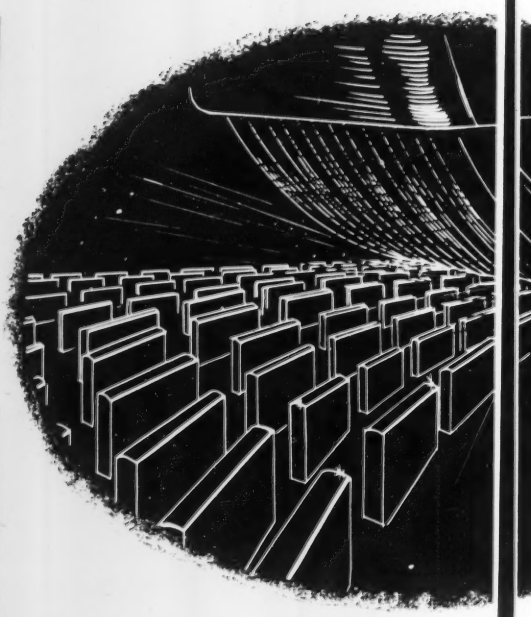
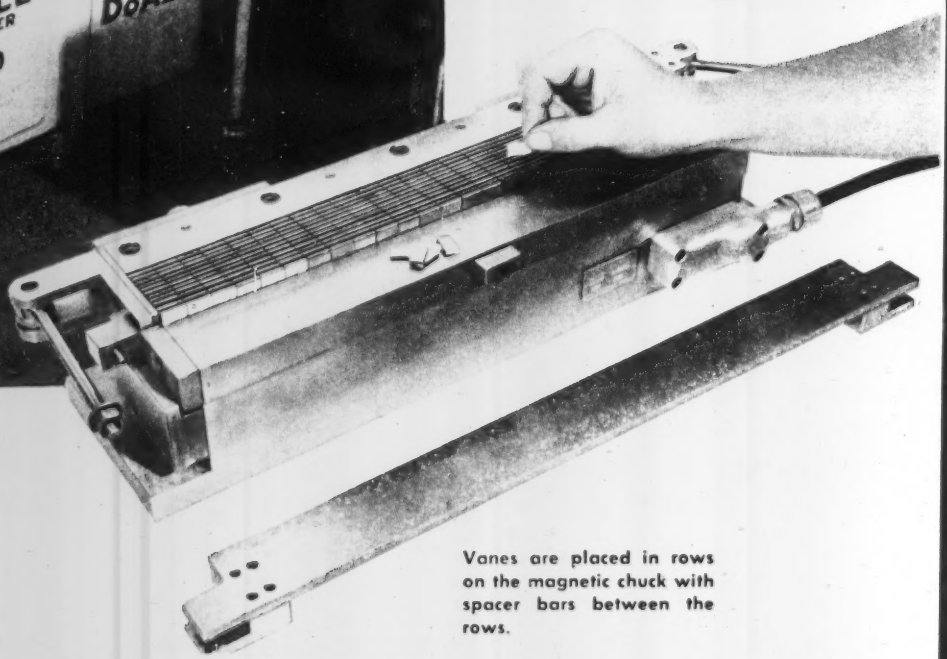
FORM GRINDING for

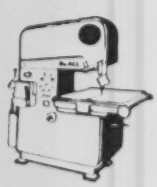


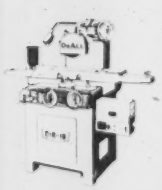
Above — DoALL Model D-10 Grinder. Once the controls are set, the grinder operates automatically until the job is finished. Form grinding attachment provides table speeds from one inch to 75 feet per minute. Combination "Cool-Grinding" and flood cooling permits heavier cuts without burning work. Remote electric control panel simplifies operation.





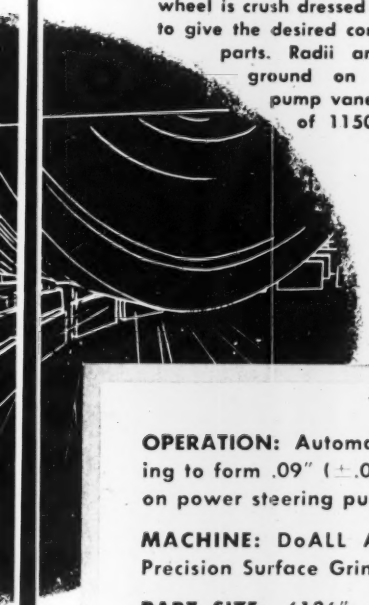
Vanes are placed in rows on the magnetic chuck with spacer bars between the rows.





MACHINE TOOLS

POWER STEERING



GRINDING TO A PROFILE — The wheel is crush dressed to a profile to give the desired contour to the parts. Radii are precision ground on these tiny pump vanes at a rate of 1150 per hour.

The performance of power steering depends on the precision of its parts.

OPERATION: Automatic grinding to form .09" (±.03") radius on power steering pump vanes.

MACHINE: DoALL Automatic Precision Surface Grinder.

PART SIZE: .6136" x .343" x .0775".

DOWNFEED: .0005" per pass.

TABLE SPEED: 40 fpm.

COOLING: Combination flood and "Cool-Grinding"* with high detergent soluble oil.

PRODUCTION: 1150 pieces per hour.

SURFACE FINISH: 10 to 15 micro-inches RMS, free of checks or cracks.

*In DoALL "Cool-Grinding" (U.S. Pat. No. 2470350), coolant flows *through* the wheel and out at point of contact with the work. Standard wheels are used.

DoALL Precision Surface Grinders Form Radii on Pump Vanes; Surface Finish 10 to 15 Micro-inches; Production 1150 pieces per hour

FORM GRINDING is a real test of a surface grinder! The loads imposed on the machine during crush dressing of the wheel are more than ten times as great as those imposed by straight surface grinding. Additionally, grinding of irregular contours creates axial as well as radial loads on the wheel and spindle. Close tolerances, fine finish and high production require great rigidity and accuracy of all grinder parts.

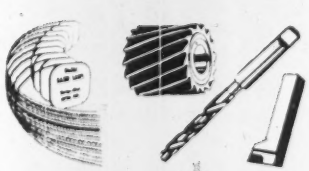
The operation described here is real proof of the rigidity and accuracy built into DoALL Precision Grinders. It is ample evidence that no grinder excels a DoALL. It is your assurance that a DoALL will more than meet your toughest requirements.

Ask for 20-page catalog describing DoALL design, "Cool-Grinding*," automatic operation, remote control, plunge grinding and many other extras of this great new line of grinders . . . 6" x 18", 6" x 24", 8" x 24" and 10" x 30" sizes. Better yet, ask for a free demonstration in your own plant. Call your local DoALL Sales-Service Store, or write:

GR-13

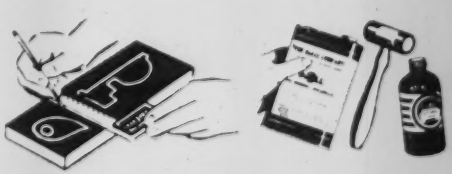
The DoALL Company, Des Plaines, Illinois

DoALL



CUTTING TOOLS

GAGING EQUIPMENT



METAL WORKING SUPPLIES

will operate the torch for 50 minutes on one filling. It weighs 6¼ pounds, has its own supporting stand, manual air pump and pressure gage.

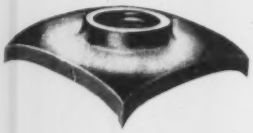
Fuel-jet clean-out plunger clears the jet while the torch is operating, without danger of fire. The 75,000 Btu per hour torch is made of stainless steel throughout. Perfection Stove Co., Dept. ST, 7609 Platt Ave., Cleveland 4, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 9

Concave Fastener

. . . no need for lock washers

P-Nut, a spring steel, concave fastener with cut threads and self-



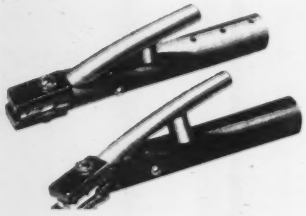
locking corners, eliminates need for lock washers and special assembly tools. It can be used to fasten parts to be taken apart as well as those not intended to be dismantled. For latter use, nut is deflected, so bolt threads are distorted. Waterbury Pressed Metal Co., Dept. ST, 304 Chase Ave., Waterbury, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Welding Electrode Holders

. . . take up to ¼-inch rod

Inside mechanism suspended in the handle for better ventilation insures cool operation for these welding electrode holders. The lightweight holders are offered in either straight nose or offset pug-nose types. Both take up to ¼-inch rod. For toughness and high conductivity, metal parts are made from aluminum bronze.



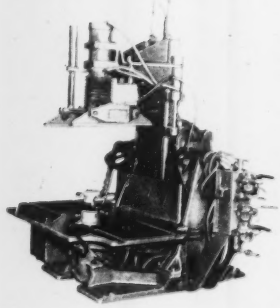
Handle insulation completely covers and protects operating mechanism. Pads for jaws and holders are interchangeable and easily replaced. Cam-Lok, division of Empire Products Inc., Dept. W-44, Box 98, Cincinnati 36, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Automatic Pattern Clamp

. . . no clamp adjustment

Automatic pattern clamping device is available on the manufac-



turer's Jolt Rollover and Rollover-Draw molding machines. Device air-clamps pattern to machine

Navy's newest anti-sub weapon — the Bell Aircraft XHSL-1. It features high rotor disc loadings for greater range and speed.

THE MASTS FOR BELL'S NEW XHSL-1 . . . . WERE MACHINED AT NATIONAL FORGE

Machined from drawn tubing, these helicopter masts are heat treated, tested, machined and plated complete in our plant ready for installation. The application demands the highest quality in metallurgical and physical properties. Maintenance of the exacting machining tolerances and acceptance by rigid inspection insure interchangeability.

The special skills required to finish machine such mechanical components have been developed at National Forge through many years of close co-operation with the aircraft industry. New tools are constantly added to meet the requirements of this rapidly growing part of our business.

Your problems of finished parts for aircraft or commercial use can be solved at National Forge. We give complete service using our forgings or purchased material when necessary to produce finished single parts or assemblies.

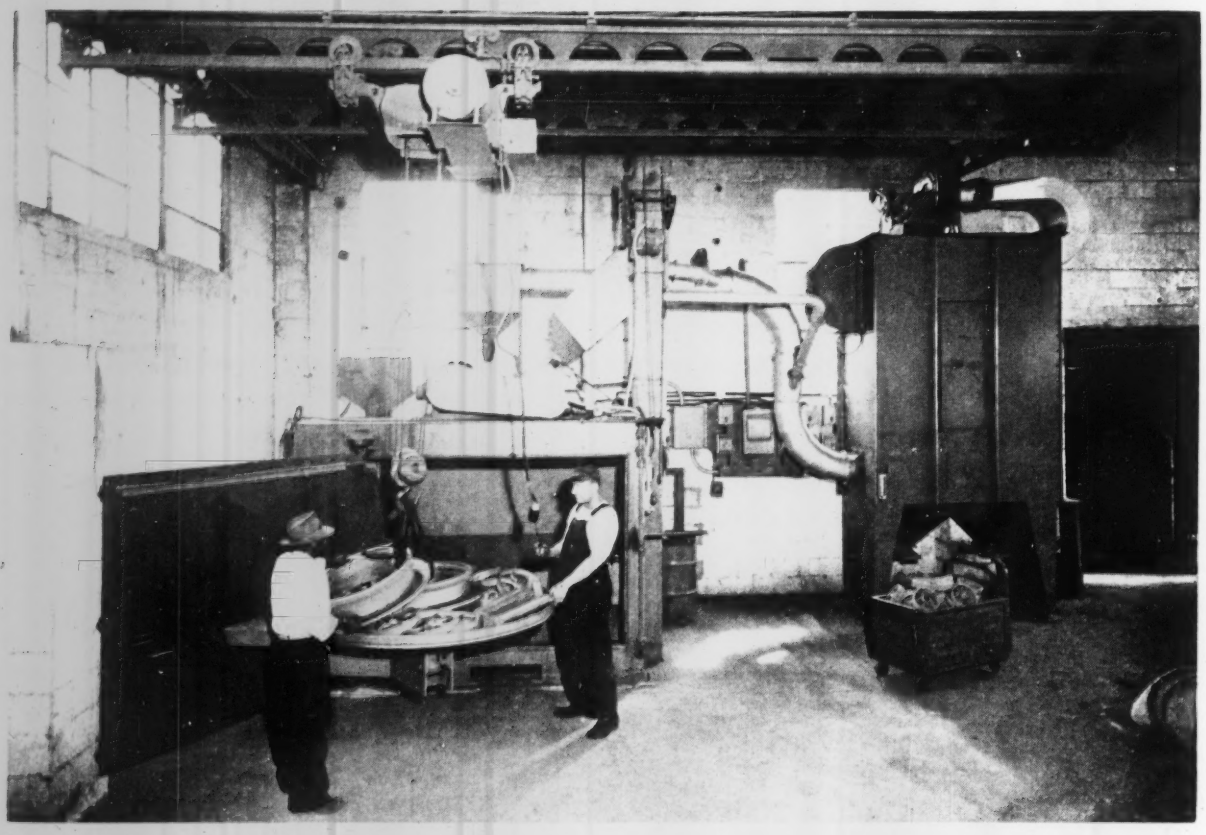
We will be glad to consider any job you have . . . and our experience in machining and metallurgical problems is available to assist you if you desire.

National Forge AND ORDNANCE COMPANY

Irvine, Warren County, Pennsylvania

STEEL MAKERS ☆ FORGESMITHS
HEAT TREATERS ☆ MACHINISTS

pioneering developments keep **WHEELABRATOR**® *first in blast cleaning*



6 different jobs and 5 cleaning operations consolidated on one machine

150 man-hours saved weekly

Cleaning costs have hit a new low at Jakes Foundry Co., Nashville, Tennessee. Instead of 6 different cleaning operations, they now have one Wheelabrator airless blast cleaning machine . . . that gives them better cleaning quality with 1/3 the manpower. Cleaning man-hours have been reduced from more than 220 weekly to less than 70. Castings weighing from one to 1000 pounds, and the products of the welding, structural steel, machine, paint and rubber shops are all cleaned on this versatile Wheelabrator Swing Table. It performs such varied jobs as removing sand, rust, scale, and preparing the surface of wheels for subsequent bonding of molded-on rubber tires. It replaced two large tumbling mills, mechanical chipping, wire brushing, chemical cleaning and surface grinding.

Based upon the results of thousands of installations like this, Wheelabrator airless blast cleaning probably can make the same savings for you. An expert analysis of your cleaning problem by one of our engineers will give you complete facts on the results Wheelabrating will provide.

To get the most for your cleaning dollars, always specify the Airless Wheelabrator . . . Wheelabrator equipment is an investment with a quick return.

Bulletin 74-B tells "What the Wheelabrator Is and What It Will Do for You." Send for a copy today!

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WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka, Ind.

table. In this way, patterns can be changed without necessity of loosening or tightening bolts or adjusting clamps. Beardsley & Piper, division of Pettibone Mulliken Corp., Dept. ST, 2424 N. Cicero Ave., Chicago 39, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

Heavy Zinc Coating

. . . one-coat application

Sprayable and brushable zinc coating, Dimetcote No. 3, protects steel against atmospheric exposures. Coating is also intended for immersion in water and salt water. An exceptionally heavy material, the coat weighs 29.6 pounds per gallon, of which 23 pounds is metallic zinc. This high solid content is reported to enable a one-coat application to provide sufficient film thickness for long-time protection.

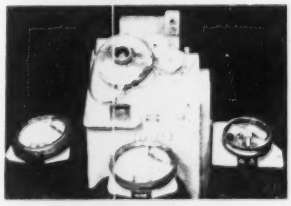
High zinc content forms a hard, abrasion-resistant surface. An important characteristic is ability to render cathodic protection wherever a break or damaged area may occur as a result of unusual abuse. Amercoat Corp., Dept. ST., 4809 Firestone Blvd., South Gate, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Internal Burring Machine

. . . rate hits 300 per minute

Model 388 internal burring machine is designed for chamfering involute contour of internal, spline and gear teeth, either straight or helical, around their full form.



Production rate depends on diameter and pitch of teeth, but is reported to reach 300 teeth per minute.

Unit is a universal machine and can be changed over from one type gear to another in less than 30 minutes. Sheffield Corp., Dept. ST, Dayton 1, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

MUELLER BRASS CO.

forgings

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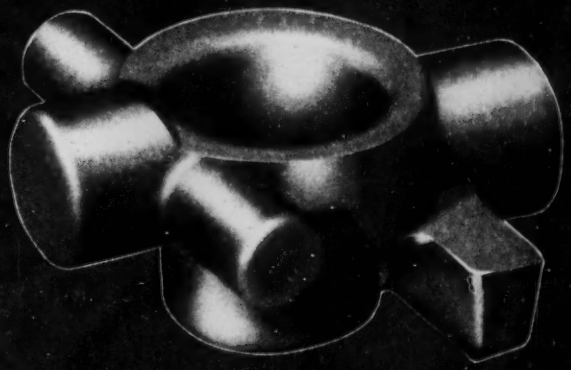

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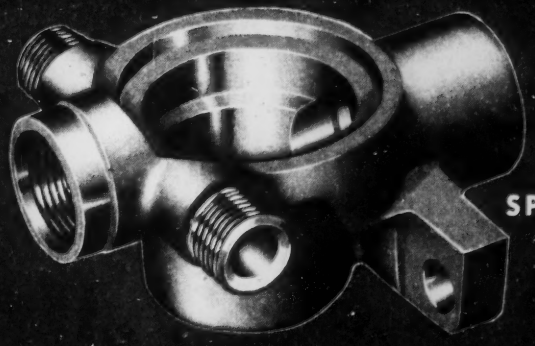

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MUELLER BRASS CO.

PORT HURON · MICHIGAN

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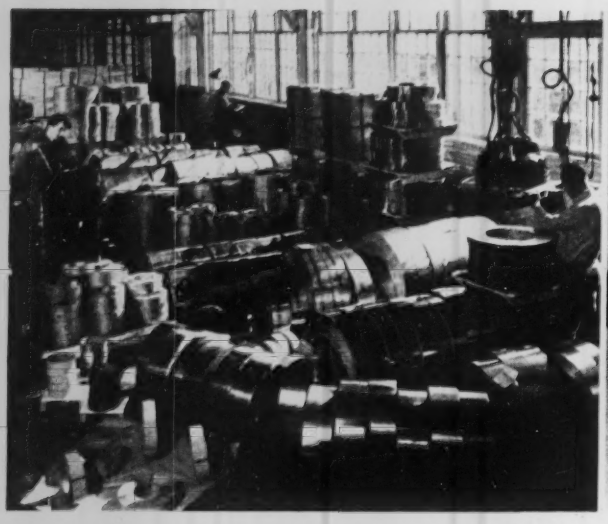
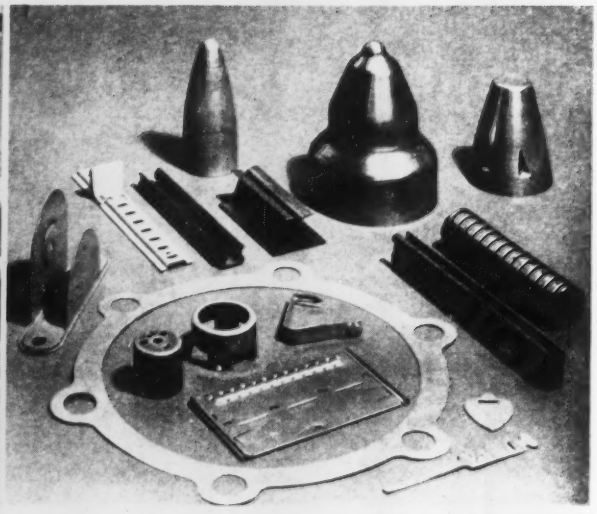


Shipping floor at Thomas Strip Division of Pittsburgh Steel Co. Finishes call for extreme care in packaging



Dense, peel-proof, zinc precoats can be drawn, bent and formed. Coating adds to product life, appearance

Precoated Strip Has Use Appeal

It combines functional properties of nonferrous metals with wide utility and economy of cold-rolled, strip steel. Coats include lead alloy, brass, nickel, zinc, copper, lacquer

MANAGERS of baseball teams have a tender spot in their hearts for a good utility man for he can play practically any position on the field.

The management of metal fabricating firms hold the same high regard for precoated strip steel: Applicationwise, it, too, is an all-around performer.

Ash trays, fuse boxes, putty knives, adding machine parts, casters, armored cables, auto clutch plates, window molding, tie clasps, cigarette lighters, keys . . . are a mere sample of the "utility" of precoated strip.

Here's Why—Take a look at the line offered by Thomas Strip Division of the Pittsburgh Steel Co., Warren, O. Their precoats include brass, nickel, lead alloy, tin, zinc, copper and lacquer. Strips go to 22 inches wide in gages down to 0.004 inch. Tempers range from 1 to 5 and "specials" are available. Finishes include natural, planished and buffed.

Strips combine the functional properties of nonferrous metals with the wide usefulness and economy of cold-rolled, strip steel. Added attraction to some users is that they can sidestep preparation and plating and focus their attention on fabrication and assembly.

Other benefits: Compared to uncoated steel, the material works more smoothly through dies and intricate forming rolls (prolonging die life by acting as a lubricant and reducing wear); coating adds corrosion resistance during processing and to the finished article; and, if desired, precoating makes a ready base for further plating or painting.

Newcomer — Latest addition to the Thomas line is electro lead alloy strip. It's being used in the manufacture of large communication cables that require a perfect moisture seal. Some suggested applications: Air cleaners, foundry chaplets, paint cans, fuel tanks, radiators, convection and heating coils for air conditioners.

Using the electrolytic process, base strip steel is coated with an alloy containing about 85 per cent lead and 15 per cent tin. Widths run to 20 inches with gages ranging from 0.050 inch.

Its resistance to atmospheric corrosion is said to be superior to a similar coating of pure tin. Tin content also makes the coating harder and improves its soldering and spot welding qualities (in making communication cable, it is reported that strip can be soldered without use of acid flux; consumption of solder is held to a minimum; and coating stays solderable over long periods of time).

Alloy is homogeneous and dense. Salt spray tests indicate low porosity and its superiority to copper,

nickel and zinc electro-deposits of the same thickness.

Copper Coat—This strip is widely used as a low cost product for functional applications and as a ready base for further plating. It protects parts against rust in process and is especially suited for tinning, soldering and brazing. Finishes: Natural, planished and buffed.

Zinc Coat — This dense, peel-proof coat adds to product life and appearance. Fabricated parts get long protection inside and out. Natural finish is popular. Bonderized strip is available for improved adherence of paint, lacquer and enamel.

Precoated edges can be furnished on wide and narrow strip, including flat wire. High luster of the buffed finish can be retained by immediate application of a clear lacquer coating.

Nickel Coat—Product helps retard corrosion, tarnishing and staining and improves resistance to oxidation at high temperatures. Applications include electronic equipment, such as radio and television, and decorative work.

Hardness and ductility of this strip (they approach these properties in mild steel) give manufacturers a broad choice of fabricating methods, from simple stampings to deep draws.

Brass Coat—Decorative work is one of the top uses here. Strip can be easily oxidized to a variety of shades, then lacquered for a permanent finish. Given a buffed finish, it can replace more expensive metals without loss of product quality.

Uses include cases for watches, jointures for folding rules and hardware for luggage.

Tin, Lead—Uniform coating of pure tin serves as a base for further plating and reduces tool wear in forming and drawing. It makes a good base for applying more tin, babbitt and other metals. Lead alloy strip provides a base for soldering fabricated parts and is widely used as a base for painting and the protection of parts against rust during manufacture.

Lacquer Coat—This product is available in a clear finish or a variety of colors. Lacquer may be applied on one or both sides of a plain, cold-rolled or precoated strip.

Some typical applications of nickel coated strip. Hardness and ductility offer broad choice of fabrication

Lacquer over Bonderized, zinc-coated strip gives good protection against rust and corrosion, while colored lacquer is decorative.

Reduction — First step in making precoated strip is to slit coils of hot rolled strip into widths up to 22 inches, followed by removal of hot rolled scale. Rough work of reducing strip in thickness is done chiefly on a four-high, three-stand, cold reduction mill. Steckel reversing mills are used for production of light gage strip that must be held to close dimensions.

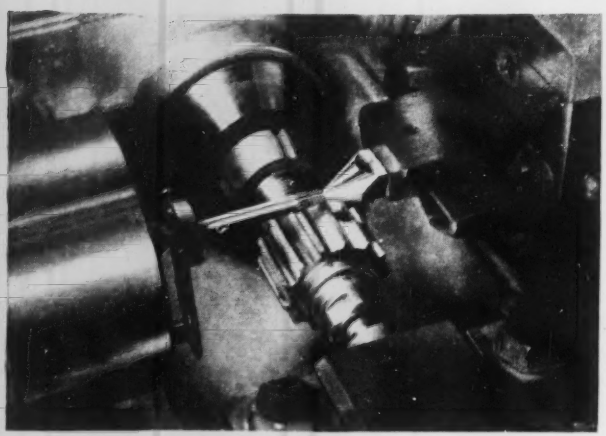
After annealing, final surface finish and temper is obtained by rolling strip in a pinch or temper mill. Oil is run on strip to prevent rusting, and paper is fed between laps of steel to prevent scratching.

Strip then goes to one of several plating lines to get its metal coating. After an alkaline cleaning and dilute acid dip, strip moves into the plating tank where it passes between two horizontal anode beds. Rinsing, drying and coiling follow. Largest plating line (it's 440-feet long) has plated strip up to 33 inches wide.

Copper coats protect parts against rust in processing and are specially suited for tinning, soldering, brazing

CLASS AA HOBS

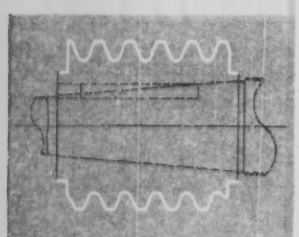
Cut Consistently Better Gears!



GET GREATER NUMBER OF CLOSE TOLERANCE GEARS

Although the hob is not the only factor affecting the accuracy of gears, it does have an important effect, particularly upon the accuracy of the profile. Class AA hobs are made to consistently closer tolerances than any other hobs and have proved themselves in actual production for many years. Performance records show that Class AA hobs produce more gears with close tolerances than any other hobs.

TAPER BORE HOBS EASIER TO MOUNT ON MACHINE



Class AA hobs with taper bore are recommended for the utmost in precision where other conditions warrant the use of a tool of this class. The accuracy of the tool, however, may be lost if the hob is not properly mounted on the machine. Compared with the sliding contact on straight hole hobs, the taper provides metal-to-metal contact, eliminating the possibility of an increase in runout during the cutting operation. Time is also saved for the operator because the hob will run as true as the spindle.

Production-line accuracy in all metal cutting operations is constantly approaching closer limits. Gear hobbing is perhaps the outstanding example. When you have gear tooth problems, be sure to ask Barber-Colman Hobbing Engineers to work with you. Their long experience in gear cutting is available to you without cost or obligation.

WRITE FOR A COPY OF HOBBING NOTES — "HOBBING ACCURATE GEARS"

Barber-Colman Company

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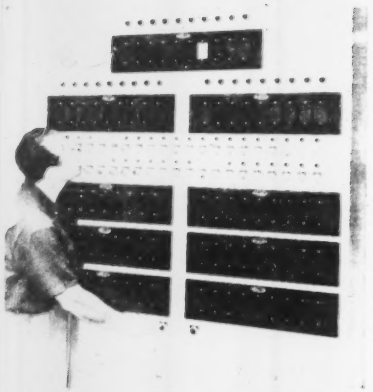
GENERAL OFFICES AND PLANT, 7712 ROCK STREET, ROCKFORD, ILLINOIS



ALARMS GO OFF IN SEQUENCE
. . . but which went first?

System Traces Trouble

ANNUNCIATOR SYSTEM automatically indicates the sequence of off-normal alarms. It's announced by Panalarm Products, Inc., Chicago, following more than a year of test field installations.

Annunciators are most desirable where alarms are applied to closely inter-related variables. In most of these applications, if any one of the variables goes off-normal, the process shuts down. Thus, with conventional systems it would be difficult to determine which variable first went off-normal and caused the shutdown.

Uses—Sequence indicating annunciators pinpoint the cause of trouble by indicating the first variable to go off. This is accomplished either by automatic lock-out of subsequent signals, or by causing the first signal to be red and subsequent signals white. A pushbutton reset feature is available which causes the sequence indication to start over again.

In addition to use in compressors and process applications where cause of trouble is sought, sequential annunciators are advantageous on dangerous processes where operators must be sure the entire process has shut down when trouble occurs.

Alarm signals are grouped for sequential lock-out by simple jumper connections on the rear terminal block, and any number of inter-related groups may be formed or interchanged as desired. All contacts, relays and other moving parts are within hermetically sealed plug-in units.

10-year foundation for customer-attracting finishes...

Beverage cooler manufactured by Mundean Mfg. Co., Columbus, Ohio, using Republic Electro Paintlok Sheets for the enamel-finished exterior and the natural-finish inner liner. Trim is Republic Enduro Stainless Steel.

Republic ELECTRO PAINTLOK SHEETS

The makers of this beverage cooler estimate that its bright red finish still will be pulling in customers after 10 years of service, outdoors or in.

The body and inside liner of the cabinet are Republic Electro Paintlok . . . the zinc-coated steel sheet that is chemically treated to *take* paints, lacquers, and synthetic enamels *smoothly* . . . and *hold* them for years, even under hard service and severe exposure.

What's more . . . the tight zinc coat helps protect the steel and the enameled finish from creeping rust and corrosion even if the painted surface should be scratched.

When you receive Republic Electro Paintlok Sheets, they are ready to paint after a simple cleaning to remove shipping grime. Even after drawing to shape, these sheets require only degreasing before painting. The zinc coating clings tight, is not cracked or peeled by normal fabrication procedures.

Get all the facts on Republic Electro Paintlok Sheets for your fabricated steel products that need to look better longer. Ask for Booklet 525.

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GENERAL OFFICES, CLEVELAND 1, OHIO
Export Department:
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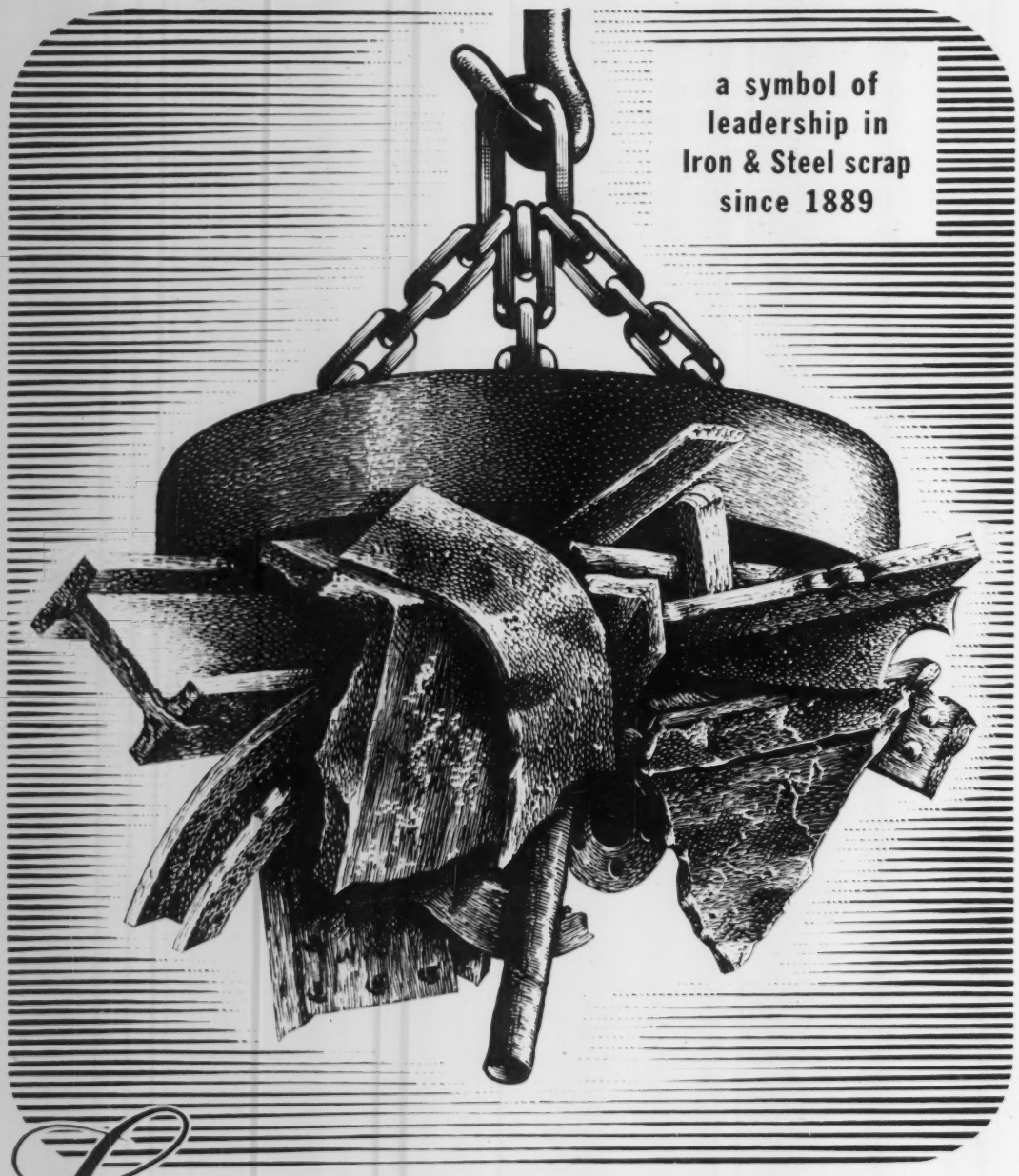
Other Republic Products include Carbon, Alloy and Stainless Steels — Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire



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Market Outlook

A NEW year's record for steel production is safely tucked into the books.

By this morning the 1953 output of steel for ingots and castings had reached a total of approximately 107,353,000 net tons, which is more than was made in all of the record year of 1951. Production that year totaled 105,199,848 tons and was the only one in which output exceeded 100 million tons until 1953.

AT YEAR'S LOW— The 1953 record is due largely to the big strides made early in the year. Output started slipping at the first of June, and now it is at the lowest rate since the strike-afflicted period of early August, 1952.

In the week ended Dec. 12, production of steel for ingots and castings was down to 85 per cent of capacity. That represents a 2-point decline from the preceding week. At the 85 per cent rate, the week's yield is 1,916,000 tons. That still is a respectable output. It was not until the beginning of February, 1951, that capacity was large enough for a weekly production of 2 million tons. The last three weeks have been the only ones this year in which output has fallen slightly below the 2-million-ton mark.

STOCKS LAST— A hint that steel production will not rebound in the coming new year as fast as had been expected is reports that steel users' inventories are not worked down as far as desired.

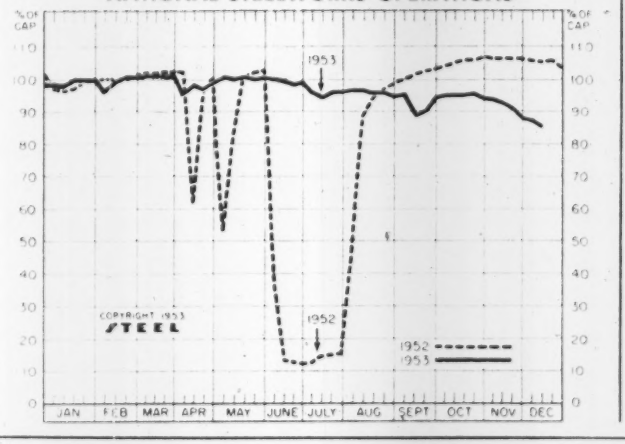
COMPETITION INTENSIFIES— This situation is intensifying competition among steel sellers. To get business, steel companies are absorbing freight charges to an increasing extent. Also, the reduction or elimination of premium base prices is continuing. As a result, STEEL's price composite on finished steel declined from $114.95 a net ton to $114.64.

MAKING CONCESSIONS— In another move to get business, steel companies are offering to sell products they have for a long time been reluctant to make. For instance, an eastern steel producer has resumed production of floor plate and is offering it at the standard price. Another steel company revised its price extras to eliminate penalties for small orders of carbon steel plate produced on a hot strip mill. That change was prompted by the lowered demand for cold-rolled carbon sheets and tin plate. Reduced demand for those two products leaves more steel and facilities available for strip mill plate. Sluggishness in demand for tin plate is aggravated further by a strike at some of the canmaking plants. It is normal procedure for mills to carry the bulk of tin plate stocks for their container customers and to ship when the material actually is needed. Because tin plate demand has been slow for some time, producers will curtail production rather than allow output to pile up in their own plants.

THE LAST TWO— About the only two products that stand out as still being in short supply are wide flange structural sections and seamless tubing. On these two products, producers are fully booked for January. Standard structural shapes now can be had without much difficulty.

UNDER PRESSURE— Reflecting the reduced demand for steel, prices on scrap—an important raw material in steelmaking—continue to decline. STEEL's price composite on steelmaking grades of scrap fell for the fourth consecutive week to $33 a gross ton from the preceding week's $34.33.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Dec. 12	Change	Same Week 1952	Week 1951
Pittsburgh	83	+ 5.5*	104	100
Chicago	94	3*	109	107
Mid-Atlantic	87	3	101	101.5
Youngstown	88	2	106	106
Wheeling	83	8	100	102
Cleveland	86	7	106.5	108
Buffalo	100	0	106.5	104
Birmingham	96.5	0	106	105
New England	80	+ 3	90	77
Cincinnati	71	0.5	93	102
St. Louis	83.5	1	96	82
Detroit	97.5	3.5	108	108
Western	90	0	107	98
Estimated National Rate	85	2	105	104

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,456 net tons in 1953; 2,027,040 tons in 1952; 1,966,034 tons in 1951.

The Metalworking Outlook—p. 69 Technical Outlook—p. 119

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Dec. 8

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., stainless, 303 (lb)	$0.675	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.767	Bars, H.R., alloy	0.418	Strip, H.R., carbon	5.013	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.125	Bars, H.R., carbon	4.850	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.233
Axles, railway	7.250	Bars, reinforcing	4.775	Pipe, galv., buttweld (100 ft)	17.731	Wire, drawn, carbon	7.713
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.860	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.550	Bars, C.F., alloy	11.075	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.653
Structural Shapes	4.383	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.488
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.765	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.847
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.904	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.174
Bars, tool steel, H.R. alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.135	Sheets, galvanized	6.945	Tubing, mechanical, stainless, 304 (100 ft)	161.193		
Bars, tool steel, H.R. alloy, high speed W 18, Cr 4, V 1 (lb)	1.730	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.183				
		Strip, C.R., carbon	7.250				

‡ Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Dec. 8 1953	Dec. 1 1953	Month Ago	Nov. Average
(1947-1949=100)	141.5	141.5	141.5	141.5

STEEL's FINISHED STEEL PRICE INDEX

	Dec. 10 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.74	189.74	189.91	181.31	151.86
Index in cents per lb	5.140	5.140	5.145	4.912	4.114

STEEL's ARITHMETICAL PRICE COMPOSITE*

	Dec. 10 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT	$114.64	$114.95	$115.18	$110.98	$95.50
No. 2 Fdry, Pig Iron, GT.	56.54	56.54	56.54	55.04	46.69
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	46.29
Malleable Pig Iron, GT.	57.27	57.27	57.27	55.77	47.41
Steelmaking Scrap, GT	33.00	34.33	35.00	43.00	43.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 10 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.79
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.275
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.48
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.55	4.55	4.55	4.35	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.75-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45-5.95	5.10-5.80	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.10-5.225	4.325
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.20-6.85	5.775
Tin plate (1.50 lb), box, Pitts	$8.95	$8.95	$8.95	$8.95	$6.70

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	Dec. 10 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	46.00
Basic, deld., Phila.	60.75	60.75	60.75	59.25	50.17
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, deld., Phila.	61.25	61.25	61.25	59.75	50.67
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.09
Malleable, Valley	56.50	56.50	56.50	55.00	46.50
Malleable, Chicago	56.50	56.50	56.50	55.00	46.50
Ferromanganese, Duquesne.	200.00†	200.00†	200.00†	228.00*	163.00*

*78-82% Mn, per gross ton, Etna, Pa. †74-76% Mn, per net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$33.50	$34.50	$37.50	$44.00	$42.75
No. 1 Heavy Melt, E. Pa.	33.00	35.00	35.00	41.50	45.25
No. 1 Heavy Melt, Chicago	32.50	33.50	33.50	42.50	41.75
No. 1 Heavy Melt, Valley	32.50	33.50	35.50	44.00	42.75
No. 1 Heavy Melt, Cleve.	30.50	31.50	33.50	43.00	42.25
No. 1 Heavy Melt, Buffalo	32.50	32.50	34.50	43.00	48.50
Rails, Rerolling, Chicago	46.50	46.00	45.00	52.50	69.50
No. 1 Cast, Chicago	33.50	34.50	33.50	45.00	70.50

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$14.50
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: E.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00 f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

DAILY NONFERROUS PRICE RECORD

	Price Dec. 10	Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1952 Avg.
Copper	29.50-30.00	Oct. 20	29.50-30.00	29.750	29.606	24.500
Lead	13.30	Sept. 16	13.80	13.300	13.300	13.925
Zinc	10.00	Sept. 11	10.50	10.000	10.000	12.500
Tin	86.75	Dec. 9	86.25	83.352	81.096	121.500
Nickel	60.00	Jan. 14	56.50	60.000	60.000	56.500
Aluminum	21.50	July 15	20.50	21.500	21.500	20.000
Magnesium	27.00	Mar. 9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium, 99.8%, Freeport, Tex.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $2.00 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.50-30.00 deld. Conn. Valley, 29.625-30.125 deld. Midwest; Lake 30.125 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 13.30, chemical 13.40, corroding 13.40, St. Louis, New York basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8% standard ingots 27.00, 10,000 lb or more, f.o.b. Freeport, Tex. Sticks, 1.3 in. dia., 45.00, 100 to 4999 lb.

Magnesium Alloys: AZ91B 30.50; AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more.

Mercury: Open market, spot, New York, $185-$188 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz. nom.

Palladium: $22-$24 per troy oz.

Platinum: $91-$93 per troy oz. from refineries.

Radium: $18-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $4.25-$4.75 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $42.45 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, New York, 86.75.

Titanium: Sponge, 99.3+%, $5 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $5.35 per lb f.o.b. shipping point; less than 1000 lb $5.50; 99+% hydrogen reduced, $6.30. Treated ingots $10.43.

Zinc: Prime western 10.00, brass special 10.25, intermediate 10.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 11.35, special high grade 11.50, die casting alloy ingot 14.50, deld.

Zirconium: Sponge $14.00 per lb; powder 100 lb or more $7.00; less than 100 lb $8.00.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston Alloys 21.00-22.00; No. 12 foundry alloy (No. 2 grade) 20.25-21.25; 5% silicon alloy, 0.60 Cu max., 23.00-24.00; 13 alloy, 0.60 Cu max., 23.00-24.00; 195 alloy 22.00-22.75; 108 alloy 21.00-21.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.50-22.00; grade 2, 20.50-21.00; grade 3, 1950-20.00; grade 4, 17.50-18.50.

Brass Ingot: Red brass, No. 115, 24.50; tin bronze No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 31.50; AZ91C, 32.00; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l., 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $18.50 per cwt; pipe, full coils $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 100 000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $6; hot-rolled and forged bars, $6.

ZINC

Sheets 23.00, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50, f.o.b. mill, 36,000 lb and over. Plates 19.50-22.25.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R., ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ..	84.5	66.5	90.5
Rod, Shapes ..	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks ..	....	60.0	....

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow brass	4..72	41.66	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

ALUMINUM

(30,000 lb base; freight allowed over 499 lb)
Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. widths or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 42.05-32.76, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 49.2 to 37.6 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
⅜	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 108.00, 0.064-in. 81.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled, AZ31, 63.00, 20,000 lb or more 0.188-1.0 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 69.00, 20,000 lb or more, ¼-in. thick, widths 24-48 in., lengths 60-144 in.

Extrusion Stock: AZ31; Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00, Rod, 1 in. 66.00, 2 in. 62.50, Tubing, 1 in. OD x 0.065-in. 87.00, Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00, Channels, 5 in. 67.80, I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clipping 13.00; low copper clippings 13.00; mixed clippings 10.00; old sheet 10.00; borings and turnings 6.50-7.00; pistons and struts 7.00; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 23.00-23.50; No. 2 copper 21.00-21.50; light copper 19.00-19.50; No. 1 composition red brass 17.00; No. 1 composition turnings 16.50; mixed brass turnings 10.50; new brass clippings 17.00-17.50; No. 1 brass rod turnings 12.00-12.50; light brass 10.00; heavy yellow brass 12.50-13.00; new brass rod ends 14.50; auto radiators, unsweated, 12.50; cocks and faucets 14.50-15.00; brass pipe 16.00.

Lead: Heavy 10.50; battery plate 5.50-5.75; linotype and stereotype 12.50; electrotype 11.00; mixed babbitt 12.00-12.50.

Magnesium: Clippings 20.00-21.00; clean castings 19.00-20.00; iron castings, not over 10% removable Fe, 18.00-19.00.

Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 18.00-20.00; rods 24.00-26.00.

Nickel: Sheets and clips 70.00; rolled anodes 70.00; turnings 40.00; rod ends 70.00.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-38.00.

Zinc: Old zinc, 3.50; new die cast scrap, 3.50; old die cast scrap, 3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.00-15.50; 51S, 52S clippings 15.00-15.50; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 13.50-14.00; old sheet 11.50-12.50; old cast 11.50-12.50; clean old cable, free of steel, 15.00-15.50; borings and turnings 12.00-12.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 25.00; No. 2 copper 23.00; light copper 21.50; refinery brass (60% copper) per dry copper content 19.50; auto radiators 13.25 nom.

INGOT MAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 25.00; No. 2 copper 23.50; light copper 22.00; No. 1 composition borings 17.00-18.00; No. 1 composition solids 17.50-18.50; heavy yellow brass solids 13.50-14.00; yellow brass turnings 12.50-12.75; radiators 13.50-14.00.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $2.15 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.045; 200-499 lb $1.03; 500-999 lb $1.025; 1000 lb or more $1.02.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 2500 oz and over 77.375.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb '8.80, 20,000 lb and over 17.80; granular, add 1.0 premium to above.

Sodium Stannate: Less than 100 lb 67.7; 100-600 lb 53.7; 700-1900 lb 51.1; 2000-9900 lb 49.4; 10,000 lb or more 48.3.

Stannous Chloride (Anhydrous): Less than 50 lb $1.527; 50 lb $1.87; 100-300 lb $1.037; 400-900 lb $1.013; 1000-1900 lb 98.8; 2000-4900 lb 95.2; 5000-19,000 lb 89.1; 20,000 lb and over 83.

Stannous Sulphate: Less than 50 lb $1.229; 50 lb 92.9; 100-1900 lb 90.9; 2000 lb and over 88.9.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

Real test of business conditions in copper and brass industry will come in first quarter of 1954. That's when you'll be able to see the effect of lower prices

BUSINESS CONDITIONS today in the copper and brass industry, to quote a top sales official's laconic pronouncement, "leave much to be desired," but the real test will come in the first quarter.

That's when a lower copper price is expected to be reflected in prices of copper wire mill, brass mill and foundry products. Then these goods will be in an improved position with competitive metals. Fabricators, too, will be less inclined to minimize stocks in anticipation of price declines, as has been general practice in industry.

Sum Total—Sales in the third and fourth quarters have slackened from their greyhound pace of the first half, but the year over-all has been excellent for the industry. A 4 per cent gain in shipments of copper and copper alloy mill and foundry products will be registered in 1953, according to Business & Defense Service Administration.

Estimates by the agency place total shipments for '53 at 2,556,500 tons, a gain of 91,500 tons from 1952. (See accompanying table.) Brass mill product shipments this year are expected to amount to 1,329,000 tons (up 4 per cent), copper wire mill products 720,500 tons (up 5 per cent) and copper-base foundry products 507,000 tons (up 1 per cent).

Form Reversal—Sharp changes are shown in product mix. Total brass mill product shipments to the military dropped almost 10 per cent, while civilian users took nearly 9 per cent more than in 1952. Alloy rod showed the most drastic cutback. Higher shipments of alloy sheet and tube were caused by an accelerated ammunition program. Stripping controls from copper caused much of the civilian pickup.

Brass mill product shipments for the military dipped 32,000 tons, but civilian shipments boomed by 84,000 tons. Copper wire mill products shipped for defense fell off 18,500 tons (24 per cent), but other shipments increased 53,500 tons (9 per cent). Slight increase shown by foundry products stems almost entirely from higher military requirements. Military take is declining substantially for brass mill goods other than alloy sheets, which are in demand by both ammunition makers and civilian fabricators, and foundry products, which maintain a steady, if undramatic pace.

A Change in Product Mix—

SHIPMENTS OF COPPER AND COPPER-BASE ALLOY PRODUCTS

Net Tons

	1953*	1952
TOTAL Shipments	2,556,500	2,465,000
Brass Mill Products	1,329,000	1,277,000
Unalloyed	353,500	368,000
Rod	57,500	75,500
Sheet	133,500	132,500
Tube	162,500	160,000
Alloyed	975,500	909,000
Rod	380,000	430,500
Sheet	487,000	380,500
Tube	108,500	98,000
Copper Wire Mill Products	720,500	685,500
"Copper" Foundry Products	507,000	502,500

Source: U. S. Dept. of Commerce *Estimated

Product Mix — Of the alloyed wrought forms, defense and AEC took 46 per cent less rod but 21 per cent more sheet and 20 per cent more tube, while civilian uses required 4 per cent more rod, 32 per cent more sheet and 8 per cent more tube.

In unalloyed products, the military took 20 per cent more rod but 38 per cent less sheet and 29 per cent less tube. Nondefense applications required 25 per cent less rod, 4 per cent more sheet and 4 per cent more tube.

Aluminum Output Off Slightly

Second consecutive month of minor decline was shown by the primary aluminum industry in October, according to Aluminum Association statistics. The 108,219 tons turned out compare with an August high of 110,545 tons and September's 109,334 tons. The setbacks are caused by seasonal power shortages (so far surprisingly mild) putting a portion of high-cost production facilities out of commission temporarily.

Shipments of aluminum products showed these trends: Declines were registered in sheet and plate—both heat-treatable and non-heat-treatable categories, sand and permanent mold castings, rod and bar, and electric wire and cable. Gains came in foil, extruded products, diecastings, drawn and welded tube, wire and forgings. Forgings shipments nearly doubled in the month. October's 2904 tons compared with 1640 in September.

Zinc Piles Up

There's still 10,000 to 15,000 tons too much monthly smelter production of zinc, despite cutbacks by American Zinc, Lead & Smelting Co., Matthiessen & Hegeler Zinc Co. and St. Joseph Lead Co. Perhaps it's cheaper to keep operating than to shut down, but continued operations are piling up a lot of zinc. At the beginning of this month, stocks stood at 165,563 tons, according to American Zinc Institute figures.

The rise during November of only 7000 tons would be considered a turning point but for these factors: The Henryetta, Okla., plant of Eagle-Picher Co. has been strikebound since the first half of November, imports are no longer threatening the market as they were several months ago and exports of 2800 tons in November were the best of the year. Production dipped to 75,830 tons in November from October's 84,031, and shipments totaled 68,684 tons. Backlog going into December stood at 29,437 tons.

Nonferrous Briefs

- Expect little additional titanium until 1956 at best. One producer today is getting 2 to 4 tons daily when it had expected to turn out 10 tons a day by now. Another is only getting 2 to 2.5 tons daily. One factor is that pressure for quality is stronger; what was good two years ago is not today. Oxygen, nitrogen and hydrogen are chief contaminants.

- Chilean copper situation is only a little less foggy. Current output is scheduled for sale to U. S. consumers at going prices, but copper men believe there will be a stall until official consummation of the U. S. copper pact.

- Over 32 million feet of aluminum gutters and downspouts have been made and marketed in the last five years by Reynolds Metals Co. At an average of 100 feet per job, about a third of a million installations have been made with the company's aluminum.

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STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company. Key on page 177. Key to footnotes, page 179.

—SEMIFINISHED—

INGOTS, Carbon Forging (NT)

Fontana,Calif. K1 ... $86.00
Munhall,Pa. U5 ... 59.00

INGOTS, Alloy (NT)

Detroit R7 ... $63.00
Fontana,Calif. K1 ... 88.00
Midland,Pa. C18 ... 62.00
Munhall,Pa. U5 ... 62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)

Aliquippa,Pa. J5 ... $62.00
Bessemer,Pa. U5 ... 62.00
Clairton,Pa. U5 ... 62.00
Ensley,Ala. T2 ... 62.00
Fairfield,Ala. T2 ... 62.00
Fontana,Calif. K1 ... 70.00
Gary,Ind. U5 ... 62.00
Johnstown,Pa. B2 ... 62.00
Lackawanna,N.Y. B2 ... 62.00
Munhall,Pa. U5 ... 62.00
So.Chicago,Ill. U5 ... 62.00
So.Duquesne,Pa. U5 ... 62.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ... $75.50
Bessemer,Pa. U5 ... 75.50
Buffalo R2 ... 75.50
Canton,O. R2 ... 75.50
Clairton,Pa. U5 ... 75.50
Cleveland R2 ... 75.50
Conshohocken,Pa. A3 ... 82.50
Detroit R7 ... 78.50
Ensley,Ala. T2 ... 75.50
Fairfield,Ala. T2 ... 75.50
Fontana,Calif. K1 ... 84.50
Gary,Ind. U5 ... 75.50
Geneva,Utah C11 ... 75.50
Houston S5 ... *84.50*
Johnstown,Pa. B2 ... 75.50
Lackawanna,N.Y. B2 ... 75.50
LosAngeles B3 ... 94.50
Munhall,Pa. U5 ... 75.50
Seattle B3 ... 94.50
So.Chicago,R2,U5,W14 75.50
So.Duquesne,Pa. U5 ... 75.50
So.SanFrancisco B3 ... 94.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ... $82.00
Buffalo R2 ... 82.00
Canton,O. R2, T7 ... 82.00
Conshohocken,Pa. A3 ... 89.00
Detroit R7 ... 84.00
Fontana,Calif. K1 ... 101.00
Gary,Ind. U5 ... 82.00
Houston S5 ... *90.00*
Ind.Harbor,Ind. Y1 ... 82.00
Johnstown,Pa. B2 ... 82.00
Lackawanna,N.Y. B2 ... 82.00
LosAngeles B3 ... 102.00
Massillon,O. R2 ... 82.00
Midland,Pa. C18 ... 82.00
Munhall,Pa. U5 ... 82.00
So.Chicago,R2,U5,W14 82.00
So.Duquesne,Pa. U5 ... 82.00
Struthers,O. Y1 ... 82.00
Warren,O. C17 ... 82.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ... $92.50
Canton,O. R2 ... 92.50
Cleveland R2 ... 92.50
Fontana,Calif. K1 ... 113.50
Gary,Ind. U5 ... 92.50
Massillon,O. R2 ... 92.50
So.Chicago,Ill. R2 ... 92.50
So.Duquesne,Pa. U5 ... 92.50

SHEET BAR (NT)

Fontana,Calif. K1 ... $93.18

SKELP

Aliquippa,Pa. J5 ... 3.85
Munhall,Pa. U5 ... 3.75
Warren,O. R2 ... 3.75
Youngstown R2, U5 ... 3.75

WIRE RODS

Alabama City,Ala. R2 ... 4.525
Aliquippa,Pa. J5 ... 4.525
Alton,Ill. L1 ... 4.70
Buffalo W12 ... 4.525
Cleveland A7 ... 4.525
Donora,Pa. A7 ... 4.525
Fairfield,Ala. T2 ... 4.525
Fontana,Calif. K1 ... 5.325
Houston S5 ... 4.925
Johnstown,Pa. B2 ... 4.525
Joliet,Ill. A7 ... 4.525
KansasCity,Mo. S5 ... 4.865
LosAngeles B3 ... 5.325
Minnequa,Colo. C10 ... 4.775
Monessen,Pa. P7 ... 4.725
No.Tonawanda,N.Y. B11 4.525
Pittsburg,Calif. C11 ... 5.175
Portsmouth P12 ... 4.525
Roebling,N.J. R5 ... 4.625
So.Chicago,Ill. R2 ... 4.525
Sparrows Point,Md. B2 ... 4.625
Sterling,Ill. (1) N15 ... 4.525
Struthers,O. Y1 ... 4.525
Torrance,Calif. C11 ... 5.325
Worcester,Mass. A7 ... 4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes

Alabama City,Ala. R2 ... 4.10
Aliquippa,Pa. J5 ... 4.10
Bessemer,Ala. T2 ... 4.10
Bethlehem,Pa. B2 ... 4.15
Clairton,Pa. U5 ... 4.10
Fairfield,Ala. T2 ... 4.10
Fontana,Calif. K1 ... 4.75
Gary,Ind. U5 ... 4.10
Geneva,Utah C11 ... 4.10
Houston S5 ... *4.50*
Ind.Harbor,Ind. I-2 ... 4.10
Johnstown,Pa. B2 ... 4.15
KansasCity,Mo. S5 ... 4.80
Lackawanna,N.Y. B2 ... 4.15
LosAngeles B3 ... 4.80
Minnequa,Colo. C10 ... 4.55
Munhall,Pa. U5 ... 4.10
Niles,Calif.(22) P1 ... 4.91
Phoenixville,Pa. P4 ... 4.95
Seattle B3 ... 4.85
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ... 4.75
Torrance,Calif. C11 ... 4.80
Weirton,W.Va. W6 ... 4.35

Wide Flange

Bethlehem,Pa. B2 ... 4.15
Clairton,Pa. U5 ... 4.10
Fontana,Calif. K1 ... 5.30
Lackawanna,N.Y. B2 ... 4.15
Munhall,Pa. U5 ... 4.10
So.Chicago,Ill. U5 ... 4.10

Alloy Stand. Shapes

Clairton,Pa. U5 ... 5.00
Fontana,Calif. K1 ... 6.40
Gary,Ind. U5 ... 5.00
Munhall,Pa. U5 ... 5.00
So.Chicago,Ill. U5 ... 5.00

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 ... 6.175
Bessemer,Ala. T2 ... 6.175
Bethlehem,Pa. B2 ... 6.20
Clairton,Pa. U5 ... 6.175
Fairfield,Ala. T2 ... 6.175
Fontana,Calif. K1 ... 6.825
Gary,Ind. U5 ... 6.175
Geneva,Utah C11 ... 6.175
Ind.Harbor,Ind. I-2 ... 6.175
Ind.Harbor,Ind. Y1 ... 6.675
Johnstown,Pa. B2 ... 6.20
Lackawanna,N.Y. B2 ... 6.20
LosAngeles B3 ... 6.85
Munhall,Pa. U5 ... 6.175
Seattle B3 ... 6.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco, B3 ... 6.80
Struthers,O. Y1 ... 6.675

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ... 6.20
Lackawanna,N.Y. B2 ... 6.20
Munhall,Pa. U5 ... 6.125
So.Chicago,Ill. U5 ... 6.125

BEARING PILES

Munhall,Pa. U5 ... 4.10
So.Chicago,Ill. U5 ... 4.10

—PILING—

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ... 4.925
Lackawanna,N.Y. B2 ... 4.925
Munhall,Pa. U5 ... 4.925
So.Chicago,Ill. U5 ... 4.925

—PLATES—

PLATES, Carbon Steel

Alabama City,Ala. R2 ... 4.10
Aliquippa,Pa. J5 ... 4.10
Ashland,Ky. (15) A10 ... 4.10
Bessemer,Ala. T2 ... 4.10
Clairton,Pa. U5 ... 4.10
Claymont,Del. C22 ... 4.20
Cleveland,O. A7 ... 4.10
Coatesville,Pa. L7 ... 4.20
Conshohocken,Pa. A3 ... 4.25
Ecorse,Mich. G5 ... 4.30
Fairfield,Ala. T2 ... 4.10
Fontana,Calif.(30) K1 ... 4.75
Gary,Ind. U5 ... 4.10
Geneva,Utah C11 ... 4.10
Granite City,Ill. G4 ... 4.30
Harrisburg,Pa. C5 ... 4.10
Houston S5 ... *4.50*
Ind.Harbor,Ind. I-2, Y1 4.10
Johnstown,Pa. B2 ... 4.10
Lackawanna,N.Y. B2 ... 4.10
Minnequa,Colo. C10 ... 4.95
Munhall,Pa. U5 ... 4.10
Pittsburgh J5 ... 4.10
Riverdale,Ill. A1 ... 4.10
Seattle B3 ... 5.00
Sharon,Pa. S3 ... 4.10
So.Chicago,Ill. U5, W14 4.10
Sparrows Point,Md. B2 ... 4.10
Steubenville,O. W10 ... 4.10
Warren,O. R2 ... 4.10
Weirton,W.Va. W6 ... 4.10
Youngstown R2, U5, Y1 4.10

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ... 5.90
Geneva,Utah C11 ... 5.25

PLATES, Wrought Iron

Economy,Pa. B14 ... 9.30

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ... 6.25
Bessemer,Ala. T2 ... 6.25
Clairton,Pa. U5 ... 6.25
Cleveland J5 ... 6.25
Conshohocken,Pa. A3 ... 6.25
Ecorse,Mich. G5 ... 6.45
Fairfield,Ala. T2 ... 6.25
Fontana,Calif.(30) K1 ... 6.95
Gary,Ind. U5 ... 6.25
Geneva,Utah C11 ... 6.25
Ind.Harbor,Ind. I-2 ... 6.25
Ind.Harbor,Ind. Y1 ... 6.75
Johnstown,Pa. B2 ... 6.25
Lackawanna,N.Y. B2 ... 6.25
Munhall,Pa. U5 ... 6.25
Pittsburgh J5 ... 6.25
Seattle B3 ... 7.15
Sharon,Pa. S3 ... 6.25
So.Chicago,Ill. U5, W14 6.25
Sparrows Point,Md. B2 ... 6.25
Youngstown U5 ... 6.25
Youngstown Y1 ... 6.75

PLATES, Alloy

Claymont,Del. C22 ... 5.55
Coatesville,Pa. L7 ... 5.55
Fontana,Calif. K1 ... 6.90
Gary,Ind. U5 ... 5.55
Johnstown,Pa. B2 ... 5.55
Munhall,Pa. U5 ... 5.55
Sharon,Pa. S3 ... 5.55
So.Chicago,Ill. U5, W14 5.55
Sparrows Point,Md. B2 ... 5.55

FLOOR PLATES

Cleveland J5 ... 5.15
Conshohocken,Pa. A3 ... 5.15
Harrisburg,Pa. C5 ... *5.15*
Ind.Harbor,Ind. I-2 ... 5.15
Munhall,Pa. U5 ... 5.15
So.Chicago,Ill. U5 ... 5.15

PLATES, Ingot Iron

Ashland,(1) C15, A10 ... 4.35
Ashland,Ky.(15) A10 ... 4.85
Cleveland,(1) R2 ... 4.70
Warren,O.(1) R2 ... 4.70

—BARS—

BARS, Hot-Rolled Carbon

Aliquippa,Pa. J5 ... 4.15
Alton,Ill. L1 ... 4.35
Atlanta,Ga. A11 ... 4.40
Bessemer,Ala. T2 ... 4.15
Buffalo(1) R2 ... *4.15*
Clairton,Pa. U5 ... 4.15
Cleveland(1) R2 ... *4.21*
Detroit R7 ... 4.30
Ecorse,Mich. G5 ... 4.35
Emeryville,Calif. J7 ... 4.90
Fairfield,Ala. T2 ... 4.15
Fairless,Pa. U5 ... 4.30
Fontana,Calif. K1 ... 4.85
Gary,Ind. U5 ... 4.15
Gadsden,Ala.(1) R2 ... *4.15*
Houston S5 ... *4.85*
Ind.Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 ... 4.15
KansasCity,Mo. S5 ... 4.80
Lackawanna,N.Y. B2 ... 4.15
LosAngeles B3 ... 4.85
Milton,Pa. M18 ... 4.15
Minnequa,Colo. C10 ... 4.60
Niles,Calif. P1 ... 4.85
No.Tonawanda,N.Y. B11 4.15
Pittsburg,Calif. C11 ... 4.85
Pittsburgh J5 ... 4.15
Portland,Oreg. O1 ... 4.90
Seattle B3, N14 ... 4.90
So.Chicago,Ill. W14 ... 4.15
Chicago(1) R2 ... *4.21*
So.Duquesne,Pa. U5 ... 4.15
So.SanFran.,Calif. B3 ... 4.90
Sterling,Ill.(1) N15 ... 4.15
Struthers,O. Y1 ... 4.15
Torrance,Calif. C11 ... 4.85
Weirton,W.Va. W6 ... 4.15
Youngstown U5 ... 4.15
Youngstown(1) R2 ... *4.20*

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ... 4.875
Buffalo R2 ... 4.875
Canton,O. R2, T7 ... 4.875
Clairton,Pa. U5 ... 4.875
Detroit R7 ... 4.975
Ecorse,Mich. G5 ... 5.075
Fairless,Pa. U5 ... *5.025*
Fontana,Calif. K1 ... 6.325
Gary,Ind. U5 ... 4.875
Houston S5 ... *5.275*
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 ... 4.875
KansasCity,Mo. S5 ... 5.575
Lackawanna,N.Y. B2 ... 4.875
LosAngeles B3 ... 5.925
Massillon,O. R2 ... 4.875
Midland,Pa. C18 ... 4.875
So.Chicago,R2, U5,W14 4.875
So.Duquesne,Pa. U5 ... 4.875
Struthers,O. Y1 ... 4.875
Warren,O. C17 ... 4.875
Youngstown U5 ... 4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ... 6.225
Bessemer,Ala. T2 ... 6.225
Bethlehem,Pa. B2 ... 6.225
Clairton,Pa. U5 ... 6.225
Ecorse,Mich. G5 ... 6.425
Fairfield,Ala. T2 ... 6.225
Fontana,Calif. K1 ... 7.475
Gary,Ind. U5 ... 6.225
Ind.Harb.,Ind. Y1 ... 6.725
Ind.Harb.,Ind. I-2 ... 6.225
Johnstown,Pa. B2 ... 6.225
Lackawanna,N.Y. B2 ... 6.225
LosAngeles B3 ... 6.925
Pittsburgh J5 ... 6.225
Seattle B3 ... 6.975
So.Chicago,W14 ... 6.225
So.Duquesne,Pa. U5 ... 6.225
So.SanFrancisco B3 ... 6.975
Struthers,O. Y1 ... 6.725
Youngstown U5 ... 6.225

BAR SIZE ANGLES, H.R.CARBON

Bethlehem,Pa. B2 ... 4.35

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5 ... 4.15
Atlanta A11 ... 4.40
Niles,Calif. P1 ... 4.85
SanFrancisco S7 ... 5.10

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ... 5.00
Fontana,Calif. K1 ... 6.00
Gary,Ind. U5 ... 5.00
Houston S5 ... *5.00*
KansasCity S5 ... 5.00
Youngstown U5 ... 5.00

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ... 5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo R6 ... 5.25
Camden,N.J. P13 ... 5.65
Carnegie,Pa. C12 ... 5.20
Chicago,W18 ... 5.20
Cleveland A7, C20 ... 5.20
Detroit P17, R7 ... 5.35
Detroit R6 ... 5.40
Donora,Pa. A7 ... 5.20
Elyria,O. W8 ... 5.20
Franklin Park,Ill. N5 ... 5.20
Gary,Ind. R2 ... 5.20
GreenBay,Wis. R7 ... 5.20
Hammond,Ind. L2, M13 5.20
Hartford,Conn. R2 ... 5.75
Harvey,Ill. B5 ... 5.20
LosAngeles R2 ... 6.65
Mansfield,Mass. B5 ... 5.75
Massillon,O. R2, R8 ... 5.20
Monaca,Pa. S17 ... 5.20
Newark,N.J. W18 ... 5.65
NewCastle,Pa. (47) B4 5.20
Pittsburgh J5 ... 5.20
Plymouth,Mich. P5 ... 5.45
Putnam,Conn. W18 ... 5.75
Readville,Mass. C14 ... 5.75
St.Louis,Mo. M3 ... 5.50
So.Chicago,Ill. W14 ... 5.20
SpringCity,Pa. K3 ... 5.65
Struthers,O. Y1 ... 5.20
Waukegan,Ill. A7 ... 5.20
Worcester,Mass. W19 ... 6.10
Youngstown F3, Y1 ... 5.20

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. (5) C19 4.45

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ... 6.325
BeaverFalls,Pa. M12 ... 6.325
Bethlehem,Pa. B2 ... 6.325
Buffalo B5 ... 6.325
Camden,N.J. P13 ... 6.50
Canton,O. R2, T7 ... 6.325
Carnegie,Pa. C12 ... 6.325
Chicago W18 ... 6.325
Cleveland A7, C20 ... 6.325
Detroit P7 ... 6.425
Detroit P17 ... 6.475
Detroit B5 ... 6.525
Donora,Pa. A7 ... 6.325
Elyria,O. W8 ... 6.325
Gary,Ind. R2 ... 6.325
Hammond,Ind. L2, M13 6.325
Hartford,Conn. R2 ... 6.775
Harvey,Ill. B5 ... 6.325
Lackawanna,N.Y. B2 .. 6.325
Mansfield,Mass. B5 .. 6.775
Massillon,O. R2, R8 .. 6.325
Midland,Pa. C18 ... 6.325
Monaca,Pa. S17 ... 6.325
Newark,N.J. W18 ... 6.65
Plymouth,Mich. P5 ... 6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ... *6.50*
Struthers,O. Y1 ... 6.325
Warren,O. C17 ... 6.325
Waukegan,Ill. A7 ... 6.325
Worcester,Mass. A7 .. 6.625
Youngstown F3, Y1 .. 6.325

BARS, Reinforcing (Fabricators)

Alabama City,Ala. R2 .. 4.15
Atlanta A11 ... 4.40
Buffalo R2 ... 4.15
Cleveland R2 ... 4.15
Emeryville,Calif. J7 ... 4.90
Fairfield,Ala. T2 ... 4.15
Fairless,Pa. U5 ... 4.30
Fontana,Calif. K1 ... 4.85
Gary,Ind. U5 ... 4.15
Houston S5 ... *4.55*
Ind.Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 ... 4.15
KansasCity,Mo. S5 ... 4.85
Lackawanna,N.Y. B2 .. 4.15
LosAngeles B3 ... 4.85
Milton,Pa. M18 ... 4.15
Minnequa,Colo. C10 ... 4.75
Niles,Calif. P1 ... 4.85
Pittsburg,Calif. C11 ... 4.85
Pittsburgh J5 ... 4.15
SanSpringsOkla. S5 ... *5.00*
Seattle B3, N14 ... 4.90
So.Chicago,Ill. R2 ... 4.15
So.Duquesne,Pa. U5 ... 4.15
So.SanFrancisco B3 ... 4.90
Sparrows Point,Md. B2 .. 4.15
Sterling,Ill. (1) N15 ... 4.15
Struthers,O. Y1 ... 4.15
Torrance,Calif. C11 ... 4.85
Youngstown R2, U5 ... 4.15

BARS, Reinforcing (Fabricated, to consumers)

Johnstown, ½-1" B2 .. 5.55
KansasCity S5 ... 6.35
LosAngeles B3 ... *5.80*
Marion,O. P11 ... 5.55
Seattle N14 ... 5.80
Seattle B3 ... *5.85*
SoSanFrancisco B3 ... *5.85*
Sparrows Pt., ½-1" B2 .. 5.55
Williamsport,Pa. S19 .. 5.45

RAIL STEEL BARS

LosAngeles(1) B3 ... *4.25*
Chicago Hts.(4) C2 ... 4.50
Chicago Hts.(4) C2 ... 4.75
Chicago Hts.(4) I-2 ... 4.50
Fort Worth,Tex.(26) T4 4.65
Franklin Pa.(4) F5 ... 4.50
Franklin Pa.(4) F5 ... 4.75
Marion,O.(4) P11 ... 4.50
Moline,Ill.(4) R2 ... 4.25
Tonawanda,N.Y.(4) B12 .. 5.00
Williamsport,Pa.(3) S19 5.25
Williamsport,Pa.(4) S19 5.45

BARS, Wrought Iron

Economy,Pa.(8 R.) B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
Me.K.Rks.(8 R.) L5 .. 10.40
Me.K.Rks.(D.R.) L5 .. 14.00
Me.K.Rks.(Staybolt) L5 15.50

—SHEETS—

SHEETS, Hot-Rolled Steel (18 gage and heavier)

Alabama City,Ala. R2 ... 3.925
Allenport,Pa. P7 ... 3.925
Ashland,Ky.(18) A10 ... 3.925
Butler,Pa. A10 ... 3.925
Cleveland J5, R2 ... 3.925
Conshohocken,Pa. A3 ... 4.05
Detroit M1 ... 4.15
Ecorse,Mich. G5 ... 4.125
Fairfield,Ala. T2 ... 3.925
Fairless,Pa. U5 ... 4.025
Fontana,Calif. K1 ... 4.70
Gary,Ind. U5 ... 3.925
Geneva,Utah C11 ... 4.025
Granite City,Ill. G4 ... 4.125
Ind.Harbor,Ind. I-2, Y1 3.925
Irvin,Pa. U5 ... 3.925
Kokomo,Ind. C16 ... 4.025
Lackawanna,N.Y. B2 .. 3.926

Munhall,Pa. U5 .....3.925
Newport,Ky. N9 .....3.925
Niles,O. N12 .....5.425
Pittsburg,Calif. C11 ..4.625
Pittsburgh J5 .....3.925
Portsmouth,O. P12 .....3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ..3.925
SparrowsPoint,Md. B2..3.925
Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ...4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
Youngstown U5, Y1 ..3.925

SHEETS, H.R. (19 gage)
AlabamaCity, A14 R2..5.225
Dover,O. R1 .....5.00
Kokomo,Ind. C16 .....5.025
Mansfield,O. E6 .....5.00
Niles,O. N12 .....5.20
Torrance,Calif. C11 ...5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy
Cleveland J5, R2 ....5.90
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.90
Fontana,Calif. K1 ....6.675
Gary,Ind. U5 .....5.90
Ind Harbor,Ind. I-2 ....5.90
Ind Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ....5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 .....5.90
SparrowsPoint(36) B2 ..5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....5.90
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)
Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)
Allenport,Pa. P7 .....4.775
Butler,Pa. A10 .....4.775
Cleveland J5, R2 .....4.775
Ecorse,Mich. G5 .....4.950
Fairfield,Ala. T2 .....4.775
Fairless,Pa. U5 .....4.850
Follansbee,W.Va. F4 ..5.775
Fontana,Calif. K1 ....5.850
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....4.975
Ind Harbor,Ind. I-2,Y1 4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2 ...4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ...5.725
Pittsburgh J5 .....4.775
Portsmouth,O. P12 .....4.775
SparrowsPoint,Md. B2 4.775
Steubenville,O. W10 ...4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ....4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.425
Fontana,Calif. K1 ....5.275
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1 7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ....7.225
Pittsburgh J5 .....7.225
SparrowsPoint (38) B2 7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron
Butler,Pa. A10 .....5.275
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Gal'd No. 10 Steel
AlabamaCity,Ala. R2..5.275
Ashland,Ky.(8) A10 ..5.275
Canton,O. R2 .....5.275
Delphos,O. N10 .....5.275
Dover,O. R1 .....5.275
Fairfield,Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity,Ill. G4 ....5.475
Ind Harbor,Ind. I-2 ....5.325
Irvin,Pa. U5 .....5.275†
Kokomo,Ind.(13) C16..5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....5.80
Pittsburg,Calif. C11 ...6.025†
SparrowsPoint,Md. B2 5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ...6.275†
Weirton,W.Va. W6 ....5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10 High-Strength Low-Alloy
Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2 .8.075

SHEETS, Galvanized Ingot Iron No. 10 flat
Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	6.475	6.925
Fairfield, Ala. T2	6.075	6.325
Gary,Ind. U5	6.075	6.325
Ind Harbor I-2	6.075	6.325
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.525	....
MartinsFry.,O. W10	6.075	....
Pitts.,Cal. C11	6.825	....
SparrowsPt. B2	6.075	....
Torrance,Cal. C11	*7.075*	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.575
Fairfield, Ala. T2	6.325
MartinsFerry,O. W10	6.325

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.82(a)
Kokomo,Ind.(13) C16..5.925
Niles,O. N12 .....6.35

†Based on 5c zinc

SHEETS, ZINCGRIP Steel
Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron
Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ..5.875
Ind Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....6.775
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.
Yorkville,O. W10 .....7.20
Follansbee,W.Va. F4 ..7.30
Follansbee (23) F4 ..7.175

SHEETS, Long Terne Steel (Commercial Quality)
BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....6.00
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....6.075

SHEETS, Well Casing
Fontana,Calif. K1 ....6.20

—STRIP—

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.175
Bessemer,Ala. T2 .....3.925
Bridgeport,Conn.(10)S15 4.15
Buffalo (27) B2 .....3.925
Butler,Pa.(8) A10 ....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.15
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 .....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. A8 .....5.15
Ind Harbor,Ind. I-2 Y1 3.925
Johnstown,Pa.(25) B2 ..3.925
KansasCity,Mo.(9) S5 4.625
Lackawanna,N.Y.(2a) B2 3.925
LosAngeles(2a) B3 .....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 .....4.15
N.Tonawanda,N.Y.B11 ..3.925
Pittsburg,Calif. C11 ...4.675
Portsmouth,O. P12 .....3.925
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(2a)B3 4.675
SparrowsPoint,Md. B2 3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 .....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. A8 .....6.80
KansasCity,Mo. S5 ....7.10
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago,Ill. W14 ....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy
Bessemer,Ala. L2 .....8.95
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....8.95
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....5.95
Ind Harbor,Ind. I-2 ....5.95
Ind Harbor,Ind. Y1 .....6.45
Lackawanna,N.Y. B2 ...6.00
LosAngeles(2a) B3 .....6.70
Seattle 25 B6 .....6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(2a) B3 .....6.70
SparrowsPoint,Md. B2 ...6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 .....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon
Anderson,Ind. G6 .....5.45
Bridgeport,Conn.(10)S15 5.45
Butler,Pa. A10 .....5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. F8 .....5.65
Detroit E20 .....5.65
Detroit D2, M1 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ...5.45
Fontana,Calif. K1 ....7.35
Franklin Park,Ill. T6 ..5.70
Ind Harbor,Ind. I-2 ....5.70
Lackawanna,N.Y. B2 ...5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.45
NewBedford,Mass. R10..6.40
NewBritain(10) S15 .....5.75
NewCastle,Pa. B4, E5..5.45
NewHaven,Conn. A7 ....6.20
NewHaven,Conn. D2 .....5.90
Pawtucket,R.I. R3 ...6.80
Pawtucket,R.I. N8 .....6.30
Pittsburgh J8 .....5.45
Riverdale,Ill. A1 .....5.50
Rome,N.Y.(29) R6 .....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wallingford,Conn. W2 ...6.20
Warren,O.(10) Ta 5.45
Warren,O. B9 .....5.75
Warren,O. R2 .....5.45
Weirton,W.Va. W6 .....5.45
Worcester,Mass. W19 ...7.05
Worcester,Mass. A7 .....6.30
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel
Bridgeprt,Conn.(10)S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 .....12.00
NewBrtn,Conn.(10)S15 12.15
Pawtucket,R.I.(11) N8 12.15
Pawtucket,R.I.(12) N8 12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ....12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy
Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.35
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J8 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2 ..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 .....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.05

STRIP, Electrogalvanized
Dover,O. G6 .....5.45
Warren,O. Ta 5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.95

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American CladmetalsCo.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co. Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Diston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 ElectroMetallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Madart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Multiwall Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott
N2 National Supply Co.
N3 National Tube Div.
N5 Nelson Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest Steel Roll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Pried Steel Strip Corp.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 StainlessWeldedProducts
S26 Specialty Wire Co. Inc.
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West Auto Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) 815	5.75	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	5.65	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.85	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.80	7.80	8.75	10.70	....
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBrtin.,Conn.(10) 815	5.75	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.85	10.65	....
NewYork W3	...	8.30	8.90	10.85	13.15
Pawtucket,R.I. N8	...	8.00	8.60	10.55	12.85
Cleve.orPitts.Base	...	7.95	8.90	10.85	13.15
Worcester,Mass.,Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	6.20	7.95	8.90	10.85	13.15
Warren,O. T9	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8	...	8.00	8.60	10.55	12.85
Spring Steel (Tempered)					
Buffalo W12			*12.50*		
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	12.50	15.00	18.00
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12			*12.50*		
Youngstown C8	...	...	12.50	15.00	18.00

SILICON STEEL

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (cut lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	8.35	9.60	10.40
Brackenridge,Pa. A4	...	...	8.85	10.10	10.90
GraniteCity,Ill. G4 (cut lengths)	...	...	8.55	9.80	....
IndianaHarbor,Ind. I-2	8.05	8.35	8.85	(34)	....
Mansfield,O. K6 (cut lengths)	7.55	7.85	8.35	9.60	10.40
Newport,Ky. N9 (cut lengths)	...	7.85	8.35	9.60	10.40
Niles,O. N12 (cut lengths)	7.55	7.85	8.35	....	....
Vandergrift,Pa. U5	...	8.35	8.85	10.10	10.90
Warren,O. R2	8.05	8.35	8.85	10.10	10.90
Zanesville,O. A10	...	8.35	8.85	10.10	10.90

SHEET, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower)	Transformer Grade 72	65	58	52
BeechBottom W10 (cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A4	11.45	....	....	....
Newport,Ky. N9 (cut lengths)	10.95	....	....	....
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45	....	....	....
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	16.05	16.55
Vandergrift,Pa. U5	14.00	14.85	15.85	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	....
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind Harbor,Ind. I-2,Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	*6.10*

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	.5.525
Aliquippa,Pa. J5	.5.525
Alton,Ill. L1	.5.70
Atlanta III	*5.725*
Bartonville,Ill. K4	.5.625
Buffalo W12	.5.525
Chicago W13	.5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	.5.525
Duluth,Minn. A7	.5.525
Fairfield,Ala. T2	.5.525
Fostoria,O. (24) S1	.5.75
Houston S5	.5.525
Johnstown,Pa. B2	.5.525
Joliet,Ill. A7	.5.525
KansasCity,Mo. S5	.6.125
Kokomo,Ind. C16	.5.625
LosAngeles B3	.6.475
Minnequa,Colo. C10	.5.775
Monessen,Pa. P7	.5.525
No.Tonawanda B11	.5.525
Palmer,Mass. W12	.5.825
Pittsburg,Calif. C11	.6.475
Portsmouth,O. P12	.5.525
Rankin,Pa. A7	.5.525
So.Chicago,Ill. R2	.5.525
So.SanFrancisco C10	.6.475
SparrowsPoint,Md. B2	.5.625
Sterling,Ill. (1) N15	.5.525
Struthers,O. Y1	.5.525
Waukegan,Ill. A7	.5.525
Worcester,Mass. A7	.5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
Los Angeles B3	*7.875*
Millbury,Mass.(12) N6	8.725
Minnequa,Colo. C10	7.175
Monessen,Pa. P7	6.925
Monessen,Pa. P16	*6.925*
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt., Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.875
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8" Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Buffalo W12	*9.50*
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	*12.55*
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P16	8.00
Monessen,Pa. P7	7.45
Pawtkt.R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.67½ 7.20*
Atlanta III	*6.775 7.30*
Bartonville(19)K4	6.675 7.225
Buffalo U12	6.675 7.075†
Cleveland A7	6.675
CrawfordsvilleM8	6.775 7.325
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
JohnstownB2(48)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175
LosAngeles B3	7.625
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.775 7.375†
Pitts.,Calif. C11	7.625 8.025†
Rankin A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
S.S.Frn.(48)C10	7.625 8.02**
SparrowsPt B2(48)	6.775 7.32†*
Sterl'g(1)(48)N15	6.675 7.225
Struthers,O Y1	6.675 7.175
Worcester A7	6.975 ....

* Based on 10c zinc; † 5c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	.149
Atlanta III	*151*
Bartonville,Ill.(19) K4	.149
Crawfordsville,Ind. M8	.151
Donora,Pa. A7	.149
Duluth,Minn. A7	.149
Fairfield,Ala. T2	.149
Joliet,Ill. A7	.149
KansasCity,Mo. S5	.161
Kokomo,Ind. C16	.151
Minnequa,Colo. C10	.154
Pittsburg,Calif. C11	.173
So.Chicago,Ill. R2	.149
So.SanFran.,Calif. C10	.173
SparrowsPoint,Md. B2	.151
Sterling,Ill.(1) N15	.149

WOVEN FENCE, 9-15½ Ga.	Col.
Ala.City,Ala. R2	140**
Ala.City 17 ga. R2	235**
Ala.City 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga. J5	143*
Atlanta III	*145*
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Jonhstown 17 ga., 6"B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE, Barbed	Col.
AlabamaCity R2	153**
Aliquippa J5	150*
Atlanta III	*158*
Bartonville,Ill. (19) K4	156
Crawfordsville Ind. M8	159
Donora, Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156*
Joliet,Ill. A7	153
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153**
S.SanFrancisco C10	173**
SparrowsPoint,Md. B2	158*
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE, (16 gage)	An'ld. Galv.	Stone Stone
Ala.City R2	12.50	14.05**
Aliquippa J5	12.50	14.30*
Bartonville(19)K4	10.73	12.51
Buffalo W12	*12.50*	....
Cleveland A7	12.50	....
Crawfordsville M8	12.50	14.35
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15
Minnequa C10	12.75	14.45**
Palmer,Mass.W12	12.50	14.05†
Pitts.,Calif. C11	12.85	14.40†
SparrowsPt. B2	12.50	14.45*
Sterling(1) N15	10.73	12.15
Waukegan A7	12.50	14.05†
Worcester A7	12.80	....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	.131
Aliquippa,Pa. J5	.131
Atlanta III	*133*
Bartonville,Ill. (19) K4	.131
Chicago,Ill. W13	.131
Cleveland A9	.137
Crawfordsville,Ind. M8	.133
Donora,Pa. A7	.131
Duluth, Minn. A7	.131
Fairfield,Ala. T2	.131
Galveston,Tex. D7	.139
Houston,Tex. S5	.139
Johnstown,Pa. B2	.131
Joliet,Ill. A7	.131
KansasCity,Mo. S5	.143
Kokomo,Ind. C16	.133
Minnequa,Colo. C10	.136
Monessen,Pa. P7	.131
Pittsburg,Calif. C11	.150
Rankin,Pa. A7	.131
So.Chicago,Ill. R2	.131
SparrowsPt., Md. B2	.133
Sterling,Ill. (1) N15	.131
Worcester,Mass. A7	.137

NAILS, Cut (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	.133
Aliquippa,Pa. J5	.133
Atlanta III	*135*
Bartonville,Ill. (19) K4	.133
Crawfordsville,Ind. M8	.135
Donora,Pa. A7	.133
Duluth,Minn. A7	.133
Fairfield,Ala. T2	.133
Johnstown,Pa. B2	.133
Joliet,Ill. A7	.133
Kokomo,Ind. C16	.135
Minnequa,Colo. C10	.138
Monessen,Pa. P7	.133
Pittsburg,Calif. C11	.152
Rankin,Pa. A7	.133
So.Chicago,Ill. R2	.133
SparrowsPt.,Md. B2	.135
Sterling,Ill. (1) N15	.133
Worcester,Mass. A7	.139

—FENCE POSTS—

	Col.
ChicagoHts., Ill. C2, I-2	.145
Duluth,Minn. A7 (49)	*145*
Franklin,Pa. F5	.145
Johnstown,Pa. B2	.145
Marion,O. P11	.145
Minnequa,Colo. C10	.150
Moline,Ill. R2	.145
So.Chicago,Ill. R2	.145
Tonawanda,N.Y. B12	.148
Williamsport,Pa. S19	.158

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	0.75	19.75	3	22.25	5.5	23.75	7	23.75	7	23	6.25	25.5	8.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)	...	...	...	...	...	...	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W. Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
Butler, Pa. F6 (†)	26.5	+2.75	19.5	+7.25	12.5	+13	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (†)	...	...	...	...	...	...	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fontana, Calif. K1 (§)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	...	...	...	...	...	...	23.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	...	...	...	...	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (‡)	26.5	0.25	19.5	+4.25	12.5	+8.5	...	...	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Youngstown Y1 (††)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...
Alton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	...	...	...	...
Benwood, W. Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Etna, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	...	...	...	...
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	...	...	...	...
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	...	...	...	...
Sharon, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	...	...	...	...
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Youngstown Y1 (††)	35.25	20	36.75	20	36.75	20	...	...	...	...
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; (††), 10.50c-11.50c; with discounts adjusted on prices of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.31	18.44
1¼	13	....	25.24	18.12
1½	13	23.12	27.89	20.01
1⅝	13	26.84	32.37	23.66
2	13	30.08	36.28	26.51
2¼	13	34.18	41.23	29.86
2¼	12	37.10	44.75	32.41
2½	12	40.51	48.86	35.70
2¾	12	43.85	52.90	38.66
3	12	45.92	55.39	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	....
Huntington,W.Va. W7	....	....	....	5.20
Indiana Harbor,Ind. I-2	4.325	4.225	4.275	....
Johnstown,Pa. B2	....	....	....	(16)5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.125	....	5.70
Steelton,Pa. B2	4.325	4.225	....	....
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES	
Fairfield,Ala. T2	5.125
Gary,Ind. U5	5.125
Ind Harbor,Ind. I-2	5.125
Lackawanna,N.Y. B2	5.125
Minnequa,Colo. C10	5.125
Pittsburg,Calif. C11	5.275
Seattle,B3	5.275
Steelton,Pa. B2	5.125
Torrance,Calif. C11	5.275

TRACK BOLTS (20) Treated	
Kansas City,Mo. S6	11.00
Lebanon,Pa. B2	11.00
Minnequa,Colo. C10	11.00
Pittsburgh O3, P14	11.00

JOINT BARS	
Bessemer,Pa. U5	5.275
Fairfield,Ala. T2	5.275
Ind Harbor,Ind. I-2	5.275
Joliet,Ill. U5	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Steelton,Pa. B2	5.275

AXLES	
Ind Harbor,Ind. S13	6.50
Johnstown,Pa. B2	6.50

STANDARD TRACK SPIKES	
Ind Harbor,Ind. I-2, Y1	7.05
Kansas City,Mo. S6	7.50
Lebanon,Pa. B2	7.05
Minnequa,Colo. C10	7.05
Pittsburgh J3	7.05
Seattle B3	7.65
So.Chicago,Ill. R2	7.05
Struthers,O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh; f.o.b. Chicago and/or freight equalized with Pittsburgh, Birmingham except where equalization is too great.

Structural ⅝-in. larger	$ 9.00c
⅞-in. under	26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ¾-in.	5
⅞-in. and larger	3
Longer than 6 in.:	
All diams.	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	29
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting Up Bolts	23

NUTS

H.P. & C.P. "regular & heavy":	
Square, all sizes	58
H.P. Hex, regular & heavy:	
⅝" and smaller	58
¾" to 1⅛", inclusive	60
1¼" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex, regular heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
½" and smaller	40
⅝" to 1½", inclusive	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	34
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼-in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5 & 10
Plated finishes	30 x 10

HEXAGON CAP SCREWS

(1020 steel; packaged, per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99+% Fe)	36.50
Unannealed (99+% Fe, minus 325 mesh)	53.50
Powder Flakes (minus 16, plus 100 mesh)	*$1.00*
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb drums, freight allowed:	
Carlots	*41.00*
Ton lots	*44.00*
Antimony, 500 lb lots	*32.00**
Brass, 20 ton lots	*29.25-36.50*
Bronze, 10-ton lots	51.00-60.00
Copper:	
Electrolytic	*13.50**
Reduced	*13.50**
Lead	*7.50**
Magnesium	75.00-85.00
Manganese:	
Minus 35 mesh	*61.00*
Minus 100 mesh	*67.00*
Minus 200 mesh	*72.00*
Nickel unannealed	89.50
Nickel Silver 5-ton lots	47.00
Nitrogen	*43.50*
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	17.50-25.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh	
1000 lb and over	5.35
Less than 1000 lb	5.50
Chromium, electrolytic *99.9% Cr min.*	*3.60*

*Plus cost of metal

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16": 1 7/16" to 1 15/16" 4.55c; 1 15/16" to 2 5/16" 4.35c.
(6) Chicago or Birm. base.
(7) To jobbers, 5 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅛" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators, to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; add 0.35c for universal mill.
(31) Base; deld within mill county.
(32) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 12 gage & lighter 60" & narrower.
(38) 14 gage & lighter 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.065", 0.065" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6.7 gage.
(49) 7 post, deduct 2 cols. for 1 post.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	54.25	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S	25.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
316L	....	....	52.50	....	....	61.00	64.25	70.00	72.00
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	53.00	39.50	49.75	59.75	71.00
501	....	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co., Sharon Steel Corp.; Shenango Ageloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%	Sheets, Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base, Cold-Rolled, 10%	Strip, Carbon Base, Cold-Rolled, Both Sides	Strip, Carbon Base, Hot-Rolled, 10%	Strip, Carbon Base, Hot-Rolled, Both Sides
Copper*	27.85	35.85	24.00	32.25

*Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25-.285	5% Cr Hot Work	0.39
Extra Carbon	0.33-.340	W-Cr Hot Work	0.41
Special Carbon	0.35-.360	V-Cr Hot Work	0.43
Oil Hardening	0.370-.39	Hi-Carbon-Cr.	0.665-.70

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.055
18.25	4.25	1	4.75	....	2.340
18	4	2	9	....	2.565-2.695
18	4	2	....	....	1.820
18	4	1	....	....	1.580-1.660
13.5	4	3	....	....	1.875
6.4	4.5	1.9	....	5	1.065
6	4	3	....	6	1.300
2	1.4	1.2	....	....	0.495
1.5	4	1	....	8.5	0.895

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON, Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Alabama City R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward, Ala. W11	52.38	52.88	56.50	....
Cincinnati, deld.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	....
Boston, deld.	66.65	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse, N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
Muskegon, Mich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., deld. from Cleve.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Philadelphia, deld.	60.75	61.25	61.75	62.25
Birdsboro, Pa. B10	58.00	58.50	....	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A3	58.00	58.50	59.00	59.50
Troy, N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
New Kensington, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, deld.	57.37	57.87	57.87	58.37
McKeesRocks, deld.	57.04	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	57.66	58.16	58.16	58.66
Verona, Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.14	58.64	58.64	59.14
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O., deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	59.50	63.00	63.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T3	....	....	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos. southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$91.00
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	95.50
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt. allowed K2	98.50
Wenatchee, Wash. OH & Fdry, freight allowed K2	95.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$81.00
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, deld.	67.55
Troy, N.Y. R2	64.00

Merry Christmas

HAPPY NEW YEAR!

A sincere thank you, from all of us at Dolan Steel, for the opportunities given us to help you with your flat rolled steel requirements.

Your continued patronage will merit our usual prompt attention and appreciation.

DOLAN *Steel Company Inc.*

810 UNION AVE. BRIDGEPORT 7, CONN.
PHONE 5-8171

NEW ENGLAND'S LARGEST STEEL WAREHOUSE, FLAT ROLLED STEEL, EXCLUSIVELY,
SERVING NEW ENGLAND, NEW YORK AND NEW JERSEY

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††*		Carbon	Floor
Baltimore	6.20	7.64	7.78	7.00		6.86	8.17§	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00§	6.30		6.15	8.50		6.35	6.35	8.65§
Boston	6.89	7.83	9.18	7.13		6.87	8.35	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	8.96	6.79		6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90		7.10	8.37		7.10	7.10	8.37
Chicago	6.18	7.12	8.00	6.42		6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.42	6.72		6.58	7.66	12.17	6.93	6.80	7.88
Cleveland	6.18	7.12	7.90	6.58		6.34	7.65	11.89	6.79	6.50	7.79
Detroit	6.38	7.31	8.29	6.71	7.36	6.56	7.60	11.92	6.93	6.80	7.80
Erie, Pa.	6.19	7.13	9.01	6.54		6.28	7.65		6.56	6.50	7.79
Houston	7.15	7.60	9.40	7.45	9.30	7.45			7.35	7.20	8.55
Jersey City, N. J.	6.54	7.45	8.42	6.82		6.75	8.43§	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.17	6.59		6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.35	6.77		6.63	7.65		6.81	6.68	
New York	6.54	7.45	8.42	6.82		6.75	8.43§	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	8.42	7.16		7.06	8.43§		6.90	6.99	8.30
Norfolk, Va.	6.90			7.20		7.20	8.50		7.20	7.15	7.85
Philadelphia	6.17	7.13	7.91	7.02	8.80	6.87	8.19§	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.30	6.55		6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	8.15	8.70	9.40	7.90		7.60	10.65		7.50	7.55	9.40
Richmond, Va.	6.50	7.45	8.00	7.10		7.05	7.95		7.10	6.85	8.10
St. Louis	6.48	7.42	8.30	6.72		6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.84	7.78	8.66	7.08		6.94	8.06		7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60		7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00		7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40?	9.80	7.60		7.60	10.55§	14.15?	7.25	7.35	9.80
Washington	6.71	8.15	8.35	7.51		7.37	8.43		7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, and cold-finished bars, 2000 lb and over, except in Seattle where base is 20000 to 9999 lb and in Erie where base is 1000 lb and over; ?—500 to 9999 lb; ?—1000 to 1999 lb; ?—1000 lb and over; ?—1500 lb to 3999; ?—under ½ in.

Distributors Look for Sales Pickup

Consumers specifying January shipment to avoid inventory build-up over yearend. Although December business is fair, freight absorption is more widespread

Cleveland—Curtailment in manufacturing schedules over the holidays will cut into steel warehouse order volume this month. Nevertheless, distributors expect to do a sizable business. The month will stack up well with the average for the year.

Distributors' stocks are pretty much in balance in most items and they will enter the new year in better position to serve the trade than for a long time past. Minor price shading is reported with competition keener. In the main, prices are unchanged but freight absorption is reported more widespread.

Philadelphia—Warehouse demand continues to taper, but distributors declare business is far from dull. Sheets and strip are the most sluggish items, but there is fair interest in bars and plates, and especially keen interest in wide flange beams.

New York—Distributors are booking small orders in fair volume but sales totals taper as yearend approaches. Alloys are slow, lagging behind carbon products.

Orders for nickel-stainless, 18-8 and other 300 series, are below expectations. Some users of straight chromium-stainless are working off inventories while former users of higher nickel grades have not yet come back to the old products. The dairy industry and certain restaurant equipment are examples.

Pittsburgh—Warehouse purchases are off and their sales have declined also this month. Consumers continue to reduce their inventories. Distributors now carry full lines of stainless steel, strip, sheets and bars. Structurals and plates are loosening in supply.

Cincinnati—Distributors report getting orders for shipment in January from inventory conscious buyers. December business is moving slowly, but January shows evidence of a pick-up. Warehouses are finding it is big customers who are still working off inventories. Most warehouses report inventories in balance, except for structurals.

Seattle—The warehouse trade is in a seasonal slump. Many consumers are reducing stocks and postponing buying until after turn of the year. Distributors' inventories are being rounded out as mill production ap-

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$4.65	$4.75	$4.65	$4.90
Bar Size Angles	4.30	4.40	4.30	4.58
Structural Angles	4.30	4.40	4.30	4.58
I-Beams	4.30	4.40	4.30	4.58
Wide Flange Beams	4.94	5.02	4.94	5.22
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.87	5.95	5.87	6.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.00	25.70	25.50	26.34
Barbed Wire	6.20	6.30	6.20	6.48
Merchant Bars	4.55	4.65	4.55	4.83
Hot Rolled Bands	4.65	4.75	4.65	4.93
Wire Rods, Thomas Commercial No. 5	4.68	4.75	4.73	5.00
Wire Rods, O.H. Cold Heading Quality No. 5	5.14	5.21	5.19	5.46
Channels	4.40	4.50	4.40	4.68
Bright Common Wire Nails, 8d	6.55	6.65	6.60	6.85

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

proaches demand. Plates are still a supply problem.

Los Angeles—With mills getting more current, warehouse receipts are improving. Traditional holiday lull in sales is expected to further unbalance inventories.

Tubular Goods . . .

Tubular Goods Prices, Page 179

Pittsburgh—While sales of oil country goods remain strong, consumers are trimming purchases of other grades. Seamless boiler tube sales are particularly low.

Los Angeles—Distributor sales are active but inquiries are tapering. Eastern mills have shortened delivery times to western jobbers to 5 months, compared with 4 months regarded as normal.

Seattle—Cast iron pipe market is dormant seasonally. Inquiry is expected to revive at turn of the year.

Wire . . .

Wire Prices, Page 178

Boston—Bookings for first quarter, including January, are lagging. Slight improvement in demand for automotive industry is not up to expectations and substantial orders are ahead for wire if production goals during first three months of next year are realized.

Many industrial consumers are living off inventories which have not been depleted to the extent expected. Ability of wire mills to schedule and process finished wire for early delivery retards forward buying and numerous finishing departments will not operate at capacity next month, duplicating December experience.

Tin Plate . . .

Tin Plate Prices, Page 178

Chicago—Continued inactivity of canmaking plants because of a strike is about to have repercussions in production of tin plate. It is normal procedure for mills to carry the bulk of tin plate stocks for their container customers and to ship when material actually is needed. Tin plate has been easy for some time with all consumers and distributors well supplied. Consequently, producers will curtail production rather than allow output to pile up in their own plants. Some reduction in rolling already has been made.

Pittsburgh—Strike affecting major canmakers depresses tin plate orders just as they were about to improve. Producers still expect satisfactory sales in first half of 1954, but business may not begin to improve until February.

Sheet Buying Lagging Seasonally

Current sluggishness in market partially attributed to usual lull attending holiday season. Consumers ordering cautiously but producers still anticipate an active first quarter

Sheet and Strip Prices, Page 176 & 177

New York—While sheet consumers have cut inventories they are still well stocked in most cases. Some users, especially in the electronics and air conditioning fields, have let their inventories get too low, but these cases are the exception and this is reflected by the fact sheet mills generally still have space available in such major grades as hot and cold sheets, galvanized sheets, and in certain minor grades, notably stainless steel.

Volume of imported sheets has dropped appreciably. However, there has been no price cutting among domestic producers. There is freight absorption on the part of various producers and in some sections of the East there have been price reductions by warehouses.

Boston—More flat-rolled tonnage is being placed for January. Beyond that month orders are slow. Sheet and strip buyers generally have adjusted procurement policy to 45-day lead and in doing so are justified by earlier mill deliveries, five to six weeks for carbon grades and four to five weeks for stainles. Even within these time limits, stampers producing for the automotive industry are hampered by uncertainty as to component requirements.

Most flat-rolled capacity for January will be taken up, and, with inventories down, there is reason to believe first quarter orders will eventually surpass fourth quarter, subject to more seller competiton and month to month buying.

Philadelphia—Sheet business lags and will become more dull before improvement sets in. Sellers expect a particular lag during the holiday season. Many doubt demand will take any sharp upturn before late January.

Freight absorption is increasingly in evidence. Latest development is decision of a midwestern mill, which normally does not attempt to compete to any extent in the East on major carbon grades, to absorb $2 on cold-rolled sheets and $3 on hot carbon sheets.

Pittsburgh—Demand for hot-rolled sheets continues to decline, and incoming orders for January aren't reaching predicted levels. Scattered cancellations on January orders indicate an improvement in market conditions may not be felt until late first quarter.

Cleveland—While sheetmakers anticipate an active first quarter, ordering for the period is not up to expectations. Consumers continue to display caution in placing forward tonnage, and indications are not much change will develop in the market between now and turn of the year.

January bookings are substantial but tonnage placed for months beyond is disappointing. Sellers generally are banking on a sharp upward bounce in automotive requirements once auto builders get squared away on new model production for first quarter.

Youngstown—Noticeable improvement in first quarter demand is reported here, extending to wire, heretofore a slow item. Some consumers are getting to the bottom of their inventories and are getting ready for 1954 business. Auto makers are holding off ordering while they try to fathom what sales will be.

Chicago—Strongest demand for first quarter sheets comes from automakers who will be gunning out-

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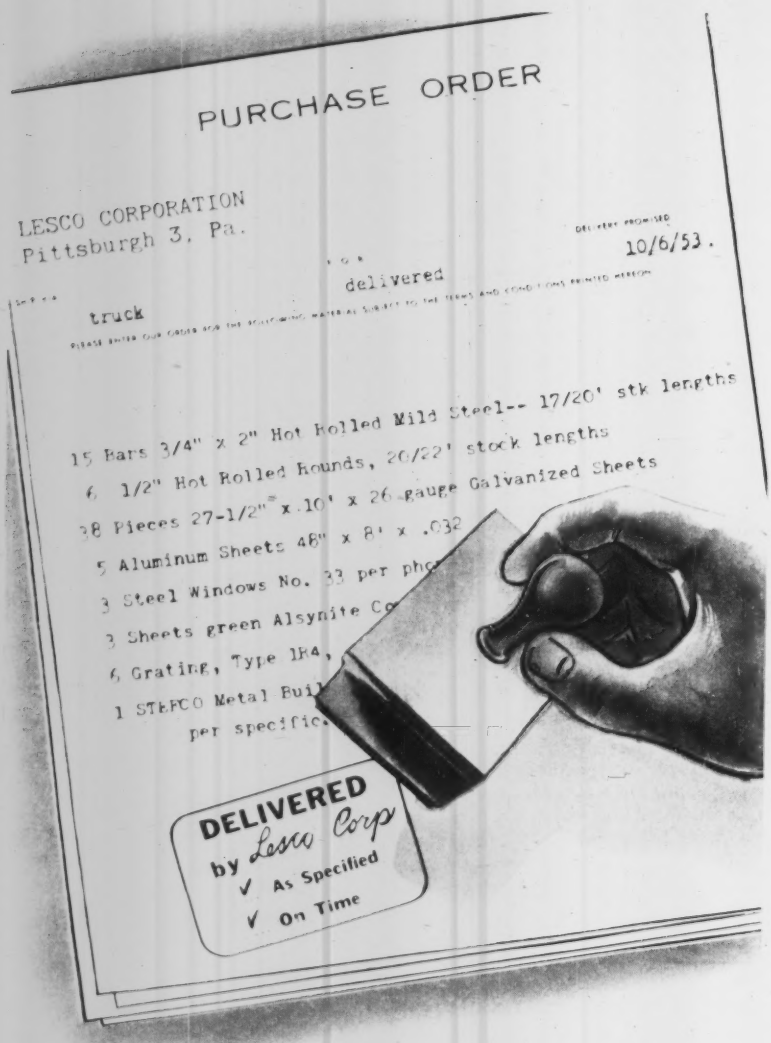
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put following new model introductions. January books for cold-rolled are filled and February business is being placed generously. All other consuming fields, however, are ordering cautiously.

Cincinnati Sheets are in excellent supply here with warehouses receiving delivery from the mills, either on schedule or slightly ahead of schedule.

St Louis First quarter sheet steel bookings are coming in slowly, due in part to heavy carryover that has put local deliveries 30 days behind, whereas outside competitors are current and can give prompt service.

Production interruptions were numerous in September and October. Galvanized sheet demand, however, has picked up sharply.

Los Angeles First quarter booking of flat-rolled products is active. Columbia-Geneva Steel Division, U. S. Steel Corp., is reducing allocations in first quarter to get current by end of January. Inquiries are more numerous.

Steel Bars . . .

Bar Prices, Page 176

Chicago Steel bars are readily available in all categories and are expected to continue so in first quarter. After demand for current consumption began to fall off this autumn, bar production continued at a strong pace because warehouses were purchasing generously to build up low and unbalanced stocks. A good working inventory has now been achieved by the warehouses and barmakers are operating with schedules geared closely to consuming needs.

Boston Delivered price, hot-rolled carbon bars, Buffalo (Republic) to Boston, 4.77c is almost identical with Fairless, Pa., 4.7738c, latter f.o.b. mill price being $3 per ton higher. Delivered price Providence and Worcester from Republic's Buffalo mill is 4.77c; federal tax is included with Springfield 4.72c. These prices are for 40 tons, carlot shipments, and freight absorption from Pittsburgh to equalize approximates $1.50 per ton. In going to delivered price selling, the Buffalo producer raised f.o.b. mill price to 4.18c from 4.15c.

First quarter carbon bar orders are rolling in better for January with heat-treated cold-finished volume in larger sizes extended into February and March. Converters are cautious in placing forward orders.

Philadelphia Hot and cold-drawn carbon bars in most sizes and shapes are available for shipment in Jan-

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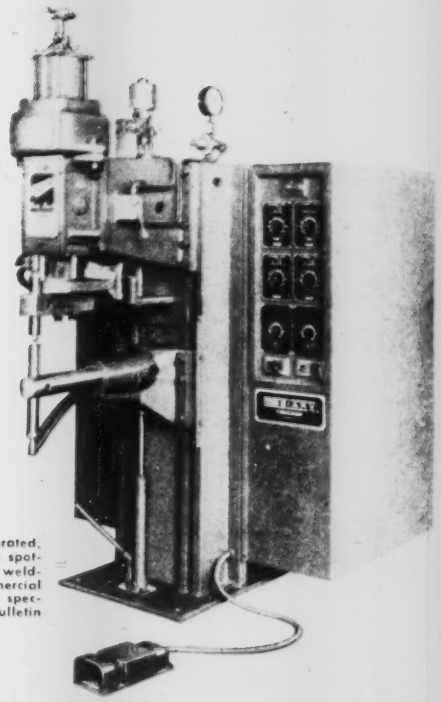

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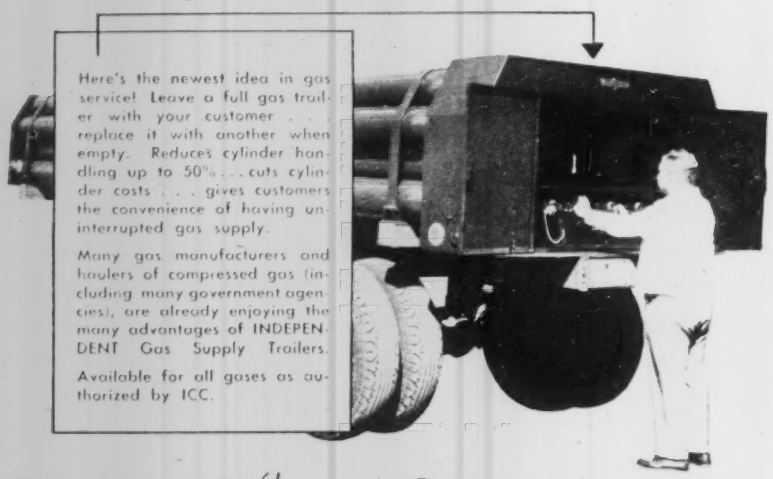

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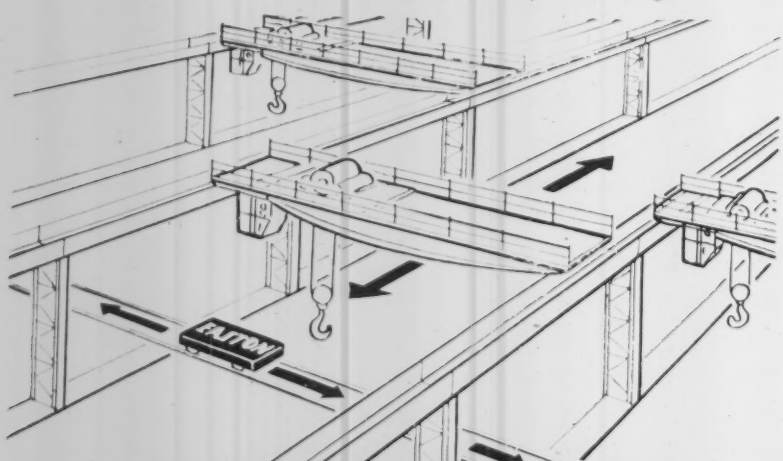

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uary. Also alloy bars are in easy supply, deliveries depending upon the amount of processing to be done. Competition in rail steel bars is particularly keen, with the Avis, Pa., producer dropping its price to 4.25c mill, a decline of $10 per ton.

Bar sellers generally look for further shrinkage in demand over remainder of this year and for a slow but steady acceleration after that. Business is expected to pick up appreciably by the end of January.

U. S. Steel Corp. has established a mill base price of 5.025c per pound for hot-rolled alloy bars produced at its Fairless works, effective Dec. 8. The price is subject to the same extras in effect at other U. S. Steel mills. Shipment of hot-rolled alloy bars from Fairless will be made in limited volume, grades and sizes.

Pittsburgh—Bar sales don't show the snap back to the strong levels that was expected earlier, when inventory reduction began.

Cleveland—Bar consumers are displaying caution in ordering for first quarter with supplies adequate in the various sizes to meet all demands. January bookings are described as good, but tonnage is available for February and March.

Republic Steel Corp.'s new method of quoting delivered prices on hot-rolled carbon bars became effective Dec. 15. So far, consumer reaction to the new pricing practice is reported as favorable.

Cincinnati—Shortages apparently have cleared up in steel bars. Distributors report little difficulty.

Structural Shapes . . .

Structural Shape Prices, Page 176

New York—Bridge work takes on special interest this week, with the New Jersey Turnpike Commission opening bids Dec. 8 on the 25,000-ton bridge over Newark Bay. This is the largest project in the district, although several other sizable jobs are active.

Boston—More bridge tonnage is being estimated. Connecticut closes Dec. 21 on 6 structures, including 4 multiple span rolled beam and one 850-foot four-span truss bridge over the Housatonic river, Brookfield-Bridgewater. Inventories with structural shops are generally in good balance, except for wide flanged beams.

Philadelphia—Structural activity is dominated by bridge work. Overall volume is off seasonally.

While wide flange beams are in tight supply, standard shapes can be had without much difficulty.

Los Angeles—Valuation of con-

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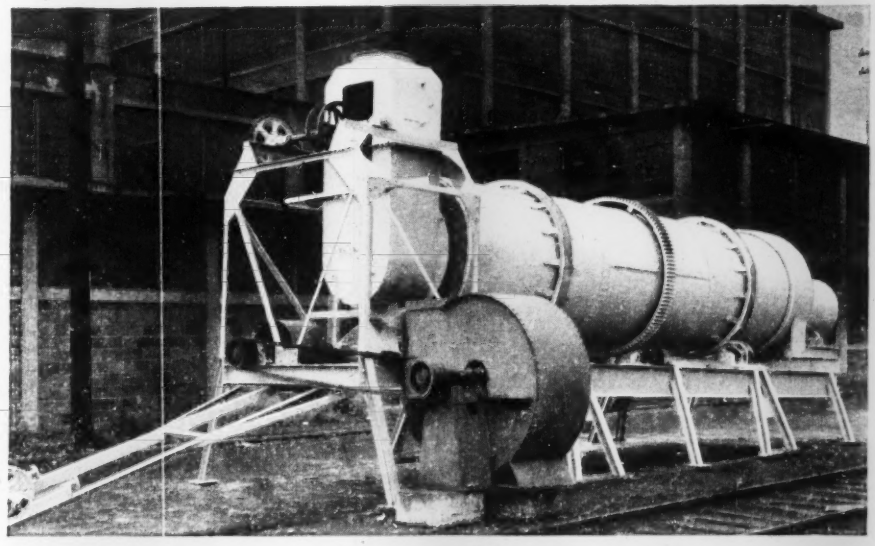

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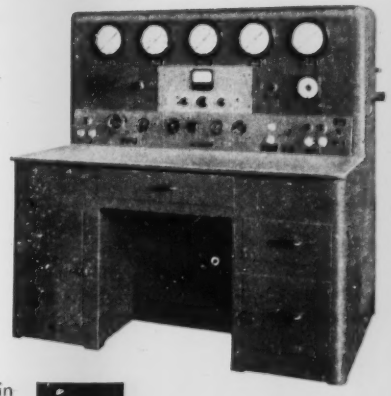

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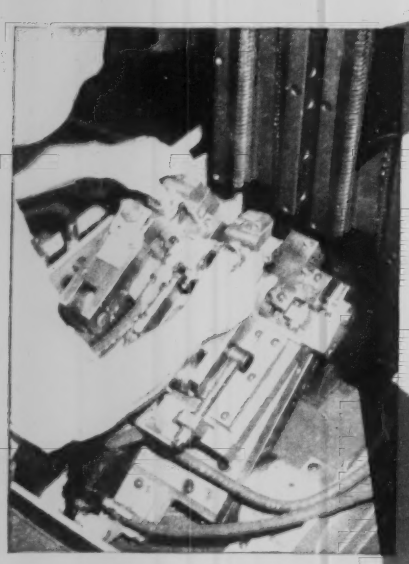

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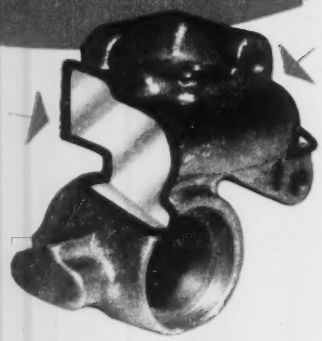

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struction in Los Angeles city reached $402,193,752 for the first 11 months this year. Supplies of small-sized structural shapes and reinforcing material are abundant.

Seattle New fabricating business is slow to develop. Several large jobs have been bid but awards are delayed.

Plates . . .

Plate Prices, Page 176

Pittsburgh Jones & Laughlin Steel Corp. has issued a new extra book on hot-rolled carbon steel plates, superseding a list dated May 23, 1953. Main purpose is to lower extras to a more competitive level.

Certain thicknesses and widths, for which an extra was formerly charged, now carry no extra. The new list contains lower item quantity extras. Orders between 10,000 and 20,000 pounds are no longer subject to an additional charge. Extras are lowered for lesser quantities, except on orders below 1000 pounds. Another lower extra reduces cost of pickling widths between 22 inches and 38 inches inclusive.

Changes reflect growing competition for sales which remain at a good level.

Philadelphia Decline in plate business is cushioned by moderately good demand from pipe fabricators and structural shops. Inquiry from tank makers has dropped appreciably but the bottom of this demand has not dropped out, in fact, is providing fair market support.

Ship demand is enlivened by requirements of approximately 30,000 tons of hull steel, mostly plates for the aircraft carrier Forrestal, on which shipyards, including the New York Shipbuilding Corp., Camden, N. J., are submitting bids next month.

Central Iron & Steel Co., Harrisburg, Pa., recently resumed production of floor plates, quoting 5.15c mill.

Boston Plate fabricating shops' steel costs will be lower next quarter for those buying carbon and alloy grades from four eastern Pennsylvania mills. They have reduced premiums to the point where all are competitive on delivered basis. Considerable wide and heavy gage capacity is involved.

Plate shops are covering for January, but not much beyond that period except for clad stock for specific requirements.

Seattle Low bidder for 6 underground tanks and other facilities at Hanford Works is Gaasland Co., Inc.,

(Please Turn to Page 191)

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F. H. Langsenkamp Company, Imperial 4321
Korhumel Steel & Aluminum Company
Idlewood 0424

KANSAS CITY, Mo., Victor 1041
Industrial Metals, Inc.

LOS ANGELES, Calif.
Eureka Metals Supply Company, Mutual 7286
Earle M. Jorgensen Co., Lucas 0281
Reliance Steel Company, Adams 3-3193

MILWAUKEE, Wis., Evergreen 4-6000
Korhumel Steel & Aluminum Corp.
of Wisconsin

MINNEAPOLIS, Minn., Geneva 2661
Korhumel Steel & Aluminum Company

NEW ORLEANS, La.
Orleans Steel Products Co., Inc.
Raymond 2116
Standard Brass & Mfg. Co., Aud. 1353

NEW YORK METROPOLITAN AREA
A. R. Purdy Co., Inc.
Lyndhurst: Webster 9-8100
New York: Chelsea 3-4455
Newark: Humboldt 2-5566

OAKLAND, Calif.
Gilmore Steel & Supply Company
G'encourt 1-1680
Earle M. Jorgensen Co., Higate 4-2030

OMAHA, Nebr., Atlantic 1830
Gate City Steel Works

ORLANDO, Fla., Phone 5-1515
Robinson Bros., Inc.

PHILADELPHIA, Penna., Delaware 6-5400
Hill-Chase & Company, Inc.
Allentown: Hemlock 2-8077
York: York 5790

PHOENIX, Ariz., Phone 8-5331
Arizona Hardware Co., Inc.

PITTSBURGH, Penna., Hemlock 1-5803
Follansbee Metal Warehouses

PORT ARTHUR, Tex., Phone 5-9377
Standard Brass & Mfg. Co.

PORTLAND, Ore., Tuxedo 5201
Eagle Metals Inc. of Oregon

SAN FRANCISCO, Calif., Klondike 2-0511
Gilmore Steel & Supply Company

SEATTLE, Wash., Lander 9974
Eagle Metals Company

SHREVEPORT, La., Phone 2-9483
Standard Brass & Mfg. Co.

SPOKANE, Wash., Keystone 0586
Eagle Metals Company

ST. LOUIS, Mo., Lucas 0051-2-3
Industrial Metals, Inc.

SYRACUSE, N.Y., Syracuse 72-6677
A. R. Purdy Co., Inc.

WICHITA, Kans., Phone 7-1208, 7-1209
General Metals Incorporated

WILKES-BARRE, Penna., Butler 7-3013
Hill-Chase & Company, Inc.

WORCESTER, Mass., Worcester 7-4521
Merrill Aluminum Corporation

(Advertisement)

Plates . . .

(*Concluded from Page 188*)

Bellingham, Wash., at $1,724,845. The project involves 620 tons of plates and other steel items. An unconfirmed report here is to the effect that of the 40,000 tons of 8-inch seamless pipe required for the Haines-Fairbanks, Alaska, petroleum products pipeline, half will be furnished by a British fabricator, the balance by National Tube Division, U. S. Steel Corp., and Jones & Laughlin Steel Corp. It is also reported British interests have been awarded part of the 14,000 tons of pipe involved in the Regina, Canada, pipeline.

Birmingham—There has been no appreciable slackening in demand for plates.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 176

Boston—Concrete reinforcing bar distributors have higher inventories to meet substantial demand, but competition is sharper with prices somewhat easier where contractors shop for concessions. Most bar fabricators holding to listed prices and extras could use more volume.

Bridges and public work, notably the former, account for the bulk of unplaced tonnage, but school buildings require better than 1000 tons.

Seattle—Backlogs are shrinking but rolling mill operators are confident potential demand for reinforcing bars is large and will result in heavy placements early in the new year.

Rails, Cars . . .

Track Material Prices, Page 179

San Francisco—Southern Pacific railroad has ordered 79 diesel freight locomotives.

Pig Iron . . .

Pig Iron Prices, Page 180

Cleveland—Merchant pig iron sellers anticipate only sluggish demand over remainder of this year. Spotty foundry operations, coupled with the fact iron is available for quick delivery, tend to discourage active demand for inventory. Further, uncertainties in the business outlook make for caution in ordering forward tonnage.

Reflecting the sluggish demand for pig iron Republic Steel Corp. has closed down another blast furnace here, 2 of its 6 stacks now being idle. Eight blast furnaces now are active in the immediate Cleveland district.

Boston—Pig iron shipments are slow, hardly equal to restricted melt, as shops enter the year-end inventory period. District furnace has slowed down production. Stockpile has reached substantial level, notably in foundry and malleable grades.

Most pig iron users have small inventories, one or two textile equipment shops being exceptions. Machine tool builders are coasting until early 1954.

New York—While base prices are unchanged, eastern pig iron producers are showing greater disposition to equalize on tonnage here. A leading Buffalo producer is absorbing sufficient freight to meet delivered prices on iron here from eastern Pennsylvania.

Business generally remains dull, with even greater dullness likely over the remainder of the year, due to holiday influences.

Some Dutch basic and foundry irons are being offered in the East again and a little foundry tonnage has been sold at $54, f.o.b. port, duty paid. However, such price is still high in competition with basic and foundry from Germany and Spain, and basic from Australia. Some irons from these latter countries have sold as low as $50, duty paid, and under. Offgrade irons have been sold at considerably lower than that.

Philadelphia—With a number of foundries planning to suspend operations during the final week of the year, pig iron specifications are light. Sellers anticipate some pickup in January, but the improvement will be slow for a while.

Foundry operations have been spotty for some time past and pig iron inventories have not suffered too greatly. Definitely livelier demand for castings must develop before the foundries, especially gray iron shops, begin stepping up specifications appreciably.

Chicago—The foundry business remains a puzzle as to future operations. Few jobbing shops are operating at full capacity three or four days a week being rather general. A number of foundries figure on shutting down the last week in the year. Pig iron is in good supply and the tendency is to carry somewhat reduced stocks. There are indications of better demand for castings in first quarter.

St. Louis—Merchant pig iron is moving at slow pace, due to operations curtailment among foundries. Production continues at capacity.

Birmingham—Pig iron production lags with demand slow as cast iron and pressure pipe plants remain com-

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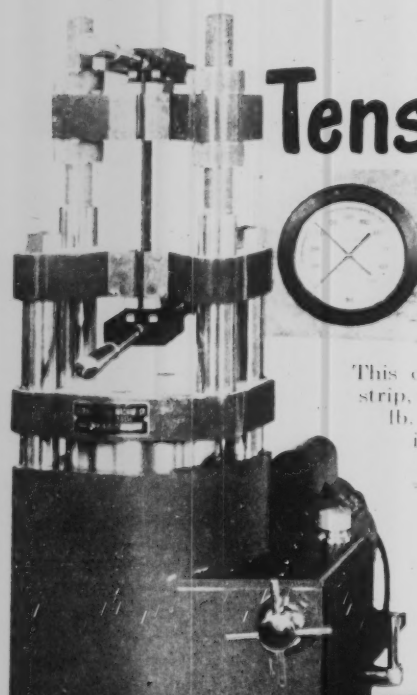

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paratively inactive. Four of the district's furnaces are idle.

Scrap . . .

Scrap Prices, Page 202

Philadelphia — Steel scrap prices generally have declined, major items being off about $2 a ton. Some buying has developed at the lowest levels, although limited, and the whole tone of the market is soft. Despite the approach of winter most consumers regard inventories as reasonably adequate.

No. 1 heavy melting steel and No. 1 bundles are available in carlots at $33, delivered, with the Conshohocken, Pa., consumer taking in truck shipments at $30. No. 2 heavy melting is now moving in carlots at $30 with the Conshohocken consumer taking in truck shipments at $27. No. 2 bundles are now $28, delivered, and No. 1 busheling $33.

Electric furnace bundles have been reduced to $35, delivered, machine shop turnings to $21, mixed borings and turnings to $23 and short shovel turnings to $27. Low phos structurals and plate have eased to a spread of $36.50 to $37.50 and heavy turnings to a flat price of $29. Couplers, springs and wheels are unchanged at $42 delivered, but rail crops, 2 feet and under, are off slightly to $48.

No. 1 cupola cast is unchanged at $35 to $36 delivered, but heavy breakable cast is off $1.50 to $38.50 and drop broken machinery has eased to around $41 to $43, delivered.

Boston — Steel scrap prices continue to sag, most grades being off $1 to $2 a ton. New buying is light with consumers holding ample inventories. Cast scrap is largely unchanged, but shows no sign of strengthening with foundry operations slackening.

New York — Scrap brokers' buying prices are nominally easier at $21.50 to $22 for No. 2 heavy melting steel and $19.50 to $20 for No. 2 bundles, $11 to $11.50 for machine shop turnings, $15 to $15.50 for mixed borings and short turnings and $16 to $16.50 for short shovel turnings.

No. 1 heavy melting steel and No. 1 bundles are unchanged at $24 to $25 and low phos structural and plate at $27.50. Cast iron grades are steady.

Consumer demand remains light, with little pickup anticipated over remainder of this month.

Cleveland — With representative scrap purchases lacking and mills holding up shipments on contracts, it

(Please Turn to Page 199)

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 7.5% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 31.5c; ton lots 33.5c; 250 to 1999 lb, 35.5c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 12.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max. Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr, c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.50c per pound of contained chromium plus 12.60c per pound of contained silicon, f.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr, 36-39%, Si 26-39%, Al 7-9%, C 0.05% max). 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb, No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% **Ferrosilicon:** Contract, carload, lump bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% **Ferrosilicon:** Contract, carload, lump bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% **Ferrosilicon:** Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% **Ferrosilicon:** Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) c.l. lump, bulk, regular 18.0c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% **Zirconium Alloy:** (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% **Zirconium Alloy:** (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet; carload packed 16.95c, ton 17.75c, less ton 18.6c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size. Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching small size only. Spot, add 0.25c.

Molybdic-Oxide Briquetts: (Containing 2½ lb of Mo_3 each) $1.14 per pound of Mo contained f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 10,000 lb W or more $1.10 per lb of contained W; 2000 lb W to 10,000 lb W, $1.20; less than 2000 lb W, $4.32; f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45 Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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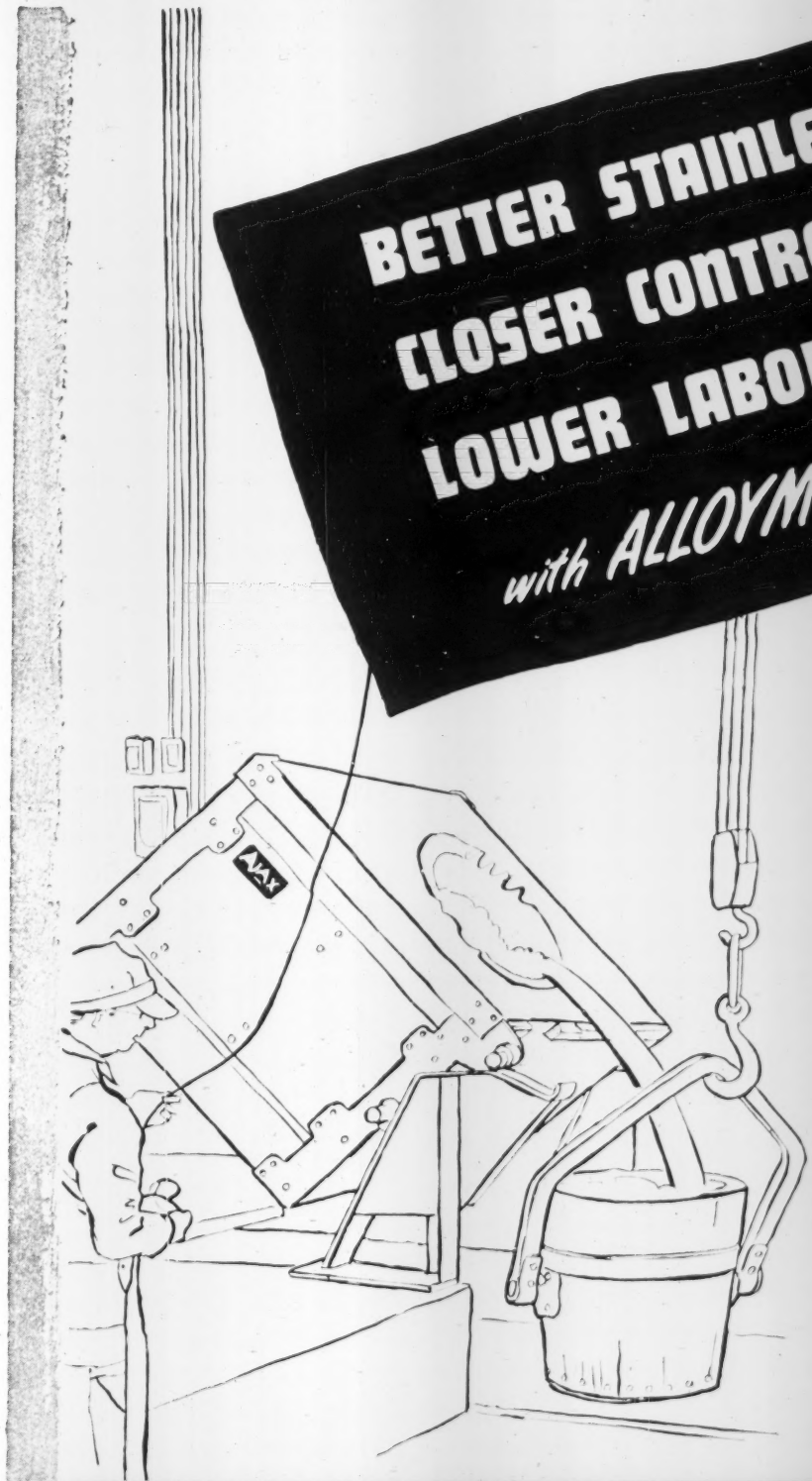

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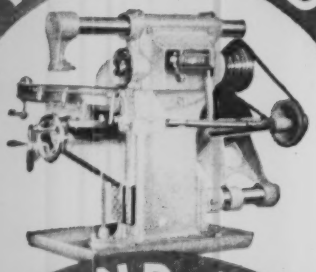

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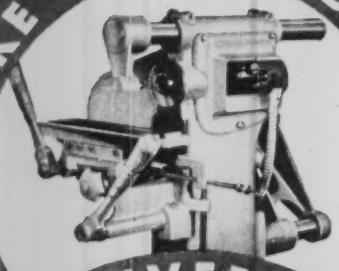
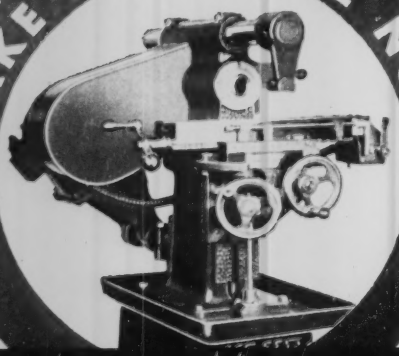


BURKE UNIVERSAL NO. 4



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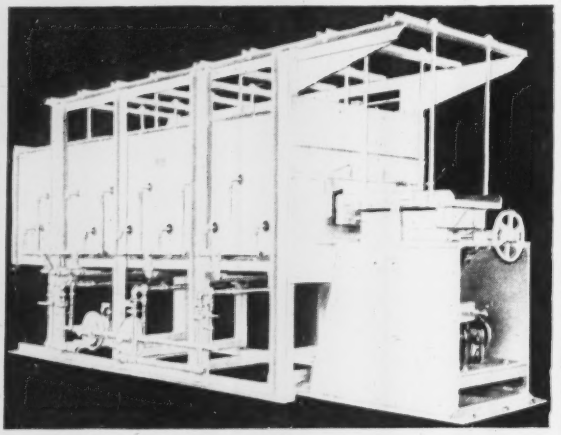
THE U. S.-BURKE MACHINE TOOL DIV.

Brotherton Road 10, Cincinnati 27, Ohio

SWING INTO HIGH PRODUCTION
WITH AGF RECIPROCATING FURNACES



The AGF Model 191-F Reciprocating Furnace is a full muffle continuous production unit. It has no gears, chains or other troublesome working parts to be affected by the interior heat. The muffle swings from the super-structure and a mechanical movement at the end of each stroke advances the work automatically.

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FINE BEARING METALS
SINCE 1860
A. W. Cadman Mfg. Co.
28th and SMALLMAN STS., PITTSBURGH 22, PA.

ORES–COKE–REFRACTORIES

Prices as reported to STEEL, changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 56-62% concentrates, contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports.

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematite (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, min. 65%, WO_3, good commercial quality	$39-$40
Domestic scheelite, mine	63.00

Manganese Ore

Mn, 48% nearby, $1.18-$1.21 per long ton unit, c.i.f. U. S. ports, duty for buyers' account; shipments against old contracts for 48% ore are being received from some sources at 90-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.:

Indian and African	
48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00
South African Transvaal	
44% no ratio	$27.00-$28.00
48% no ratio	34.00-35.00
Brazilian	
44% 2.5:1 lump	nom. $32
Domestic	
(Rail nearest seller)	
48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb. Mb content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $123; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° F: Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alley, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25, Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 Per Cent: Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk: Bellmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk, Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.00
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Buffalo, deld.	28.08
Flint, deld.	28.23
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens.

Pure benzol	40.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50
Per ton, bulk, ovens	
Sulphate of ammonia	$44.45
Birmingham area	$49.50
Cents per pound, producing point	
Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

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Diam. Inches	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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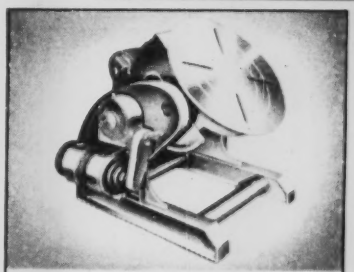
- BENDING ROLLS
- TURNING ROLLS
- AUTOMATIC WELDING FIXTURES



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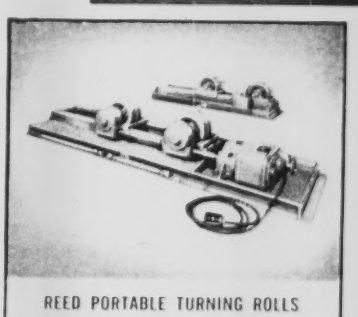

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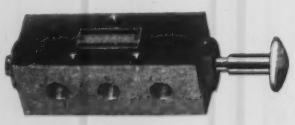

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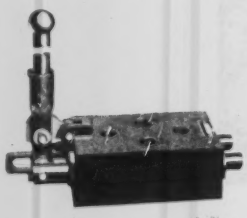
Two position or three position valves ½" to 1½" sizes for line pressures 1000 to 5000 psi. Can be furnished in neutral, compound-exhaust or compound-on actions. Pilot cylinder operated types available up to 4".



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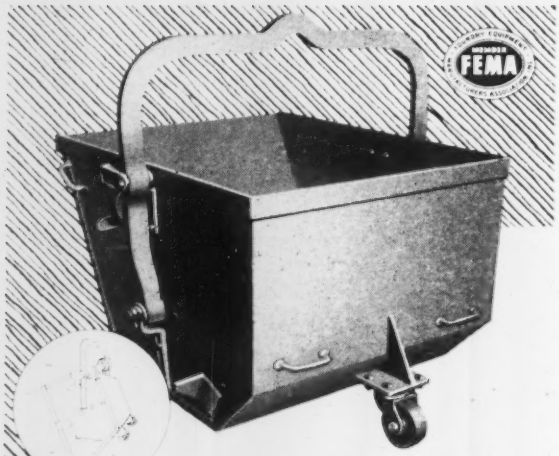

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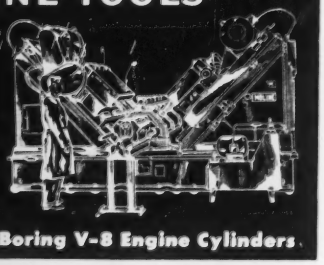

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Scrap . . .

(Concluded from Page 192)

is almost impossible to determine the exact level of the current market. Quoted prices, largely reflecting brokers' and dealers' views, dropped another $1 per ton last week, with No. 1 heavy melting $30 to $31.

Further decline is thought likely since there is little prospect of any marked pickup in demand before January at earliest. This is especially true with steelmaking operations sliding downward as steel demand continues to lag. The steel mills are holding large inventories and at the same time they are using more hot metal in their furnace charges.

Buffalo—Lack of buying interest and building up of dealers' yard stocks forced a further decline of $2 per ton in scrap here.

Pittsburgh—Steelmaking and blast furnace scrap prices declined last week, following a sizable purchase of No. 1 heavy melting at $34. Cast iron grades remained level.

Youngstown—U. S. Steel Corp.'s Youngstown district plant has declared a virtual embargo on deliveries of scrap and prices have slumped $2 to $3 a ton.

U. S. Steel had been taking some scrap at its Ohio Works and also had been piling inventory at its McDonald mills, but ordered dealers to discontinue delivering the material for the present. Other big scrap consumers in this area are out of the market.

Some small sales are reported here at $32 to $34 a ton on No. 1 steel; $31 on No. 2 steel and $29 on No. 2 bundles.

Cincinnati—Reductions of $1 a ton spread across the Cincinnati quotations, as the market sought a lower level. Generally weaker state of the market indicates buying could be done at prices lower than those quoted. How much lower is anybody's guess.

Detroit—The scrap market is at a virtual standstill. One sale confirms prices on heavy melting and No. 1 bundles, but sentiment here is definitely on the weak side.

Chicago—Some grades of open-hearth scrap have dropped $2 a ton in a small acquisition by a local mill and impact has been to depress several other grades by $1 a ton. No. 2 heavy melting and No. 2 bundles bore the $2 loss.

The unexpected development following a weakening in the East has unsettled the market here and is restricting dealer-broker transactions.

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TORRINGTON NEEDLE BEARINGS

Mill inventories are generous and steelmaking operations in the district are off 3 points to 94 per cent of capacity. Cast grades are showing weakness too.

St. Louis Steel scrap prices dropped $1 to $5 as December token mill orders came in, intended primarily to relieve broker distress. No volume buying is indicated before late in the month.

Mill stocks are good, operations are down, steel producers are looking for business to fill gaps in first quarter, weather is unseasonally good for scrap collections and deliveries. All have contributed to a glut of melting steel in dealers' hands.

Los Angeles Mills have reduced scrap purchases. Despite efforts to reduce inventories the past 6 months, Columbia-Geneva Steel Division, U. S. Steel Corp., is reported holding 3 to 4 months supply.

San Francisco The scrap market is in the doldrums. Dealers say present low prices wouldn't be so bad if they could move more tonnage. But consumption is slow, with one mill completely down because of a strike and others in the area operating around 10 per cent of capacity in their open-hearth departments. Cast grades are in good demand.

Seattle Scrap prices dropped $2 to $4 per ton last week, but the market is nominal with large buyers on the sidelines. Current quotations are $27 for No. 1 heavy melting, $23 for No. 2, $20 for unprepared, $12 for turnings. Stove plate remains at $29 but the market is soft and a decline is expected. Heavy breakable has sold at $32 and motor blocks are quoted at $23.

Iron Ore . . .

Iron Ore Prices, Page 197

Cleveland Final figures for the 1953 lake shipping season, as reported by the Lake Superior Iron Ore Association, show that the iron ore movement hit a new all-time season record mark at 95,844,449 gross tons. This was a sharp increase compared with the 74,910,798 tons moved in the 1952 season.

Total shipments from U. S. ports were 93,844,255 tons, and from Canadian ports 2,084,468 tons, the Association reports.

In November, 5,3000,431 gross tons were brought down from the head of the lakes, comparing with 9,294,947 in the like month of 1952. In the first week of December this year no ore cargoes were moved, but in the first week of December, 1952, 488,428 tons were shipped.

Semifinished Steel . . .

Semifinished Prices, Page 176

Pittsburgh U. S. Steel Corp. will discontinue operation of five remaining furnaces at No. 1 open hearth shop of the Duquesne Works, Dec. 21. Once a 20-furnace shop, 15 furnaces have already been closed down. Heavy demand for steel kept the remaining furnaces in operation.

Operations in the Pittsburgh area, at 78.5 per cent of capacity in the week ended Dec. 5, will improve following settlement of a strike at J. & L.'s Aliquippa Works.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, 20-story office building, to be first unit of Penn Center, Philadelphia, awarded through Cauldwell-Wingate, New York, to American Bridge Division, U. S. Steel Corp., Pittsburgh; Uris Bros., New York, owners.

3200 tons, state bridge work, Chester-Montgomery counties, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

2015 tons, bridge between Long Beach and Island Park, Long Island, approaches going to Schacht Steel Construction Inc., New York; with remainder to Nashville Bridge Co., Nashville, Tenn.

1500 tons, state bridge work, Allegheny county, Pennsylvania, to Ft. Pitt Bridge Works, Pittsburgh.

1100 tons, anode beams and supports, Ana-

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conda Aluminum Co., Columbia Falls, Mont., to Allied Structural Steel Co.

1100 tons, St. Joseph Normal School, Brentwood, N. Y., through J. Barannello, to Lethlehem Steel Co., Bethlehem, Pa.

200 tons, Army shops, Whittier, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; J. H. Pomeroy & Co., Seattle, general contractors.

150 tons, telephone exchange, Hammondton, N. J., to Camden Iron Works, Camden, N.J.

100 tons, office and warehouse, Helena Rubenstein, El Segundo, Calif., through Parsons Construction Co., Inc., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

25,000 tons, Newark Bay bridge, New Jersey Turnpike Commission, Bethlehem Steel Co., Bethlehem, Pa., low bidder.

3100 tons, section, state thruway, HT-53-12, Rockland county, New York; Klevens Corp., low on general contract.

3010 tons, first contract Lincoln square grade crossing elimination, Worcester, Mass.; Farina Bros. Co., Newton, Mass., low, $3,168,517.

2400 tons, section, state thruway, HT-53-10, Rockland county, New York; Del Baso Construction Co., New York City, low on general contract.

2105 tons, including 350 tons, silicon or low alloy, river spans and east viaduct approach, Missouri river bridge, Leavenworth, Kan.; bids Dec. 15, city of Leavenworth.

2000 tons, section, state thruway, HT-53-13, Westchester county, New York; Rayen Construction Co., Long Island city, N. J., low on general contract.

1470 tons, bridges, Ohio turnpike, Lucas-Cuyahoga counties, contract C-22, Ohio; bids Dec. 18, Ohio Turnpike Commission, Columbus, O.

1260 tons, four-span truss bridge, Housatonic river, Brookfield-Bridgewater, Conn., section; bids Dec. 21, Hartford, Conn.

1214 tons, bridges, Ohio turnpike, Williams county, Ohio, contracts C-60, 61 and 62; bids Dec. 18, Ohio Turnpike Commission, Columbus, O.

1000 tons, hospital unit, Medical Center, Temple University, Philadelphia; bids Jan. 4.

850 tons, Pennsylvania railroad bridge, Liberty avenue, Pittsburgh; bids closed Dec. 11.

800 tons, four-span riveted plate girder bridge, Merrimack river, Manchester, N. H.; bids Dec. 22, Concord; also 27,500 square feet, steel grid floor and sidewalks.

660 tons, structural steel and bracing, temporary railroad trestle, Winchester, Mass.; bids Dec. 22, Boston.

500 tons, state bridge over Clay creek, Newark, Del., Empire Construction Co. low on general contract.

430 tons, 1 four-span and 2 three-span rolled beam bridges, Middletown, Conn.; bids Dec. 21, Hartford.

400 tons, five stringer bridges, Boston-Fall River, Mass., expressway, Brockton-West Bridgewater, Mass. section; J. P. White Contracting Co., Cambridge, general contractor, $3,822,418.70.

400 tons, addition 15 Scott Paper Co. plant, Everett, Wash.; bids in Dec. 9.

260 tons, two-span rolled beam underpass and single span rolled beam overpass, Hartford-Springfield expressway, Windsor, Conn.; bids Dec. 21, Hartford, Conn.

260 tons, municipal bridge, York, Pa.; bids closed.

245 tons, three state bridges, Billerica-Chelmsford, Mass., G. Rotundi & Sons, Melrose, Mass., low.

187 tons, bridge, Public Service Commission, Westchester county, New York; Berlant Construction Co., Harrison, N. Y., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

500 tons, ammunition magazines, Ft. Richardson, Alaska, to Joseph T. Ryerson & Son, Inc., Seattle.

120 tons, water storage reservoir, Bremerton, Wash., to J. D. English Steel Co., Tacoma, Wash.

REINFORCING BARS PENDING

1100 tons, highway bridges, Ohio turnpike, Lucas-Cuyahoga counties, Ohio, contract C-22; bids Dec. 18, Ohio Turnpike Commission, Columbus, O.

765 tons, state bridges, Ohio turnpike, Williams county, contracts C-60, 61 and 62; bids Dec. 18, Ohio Turnpike Commission, Columbus, O.

183 tons, Garden state parkway, contract No. 62, section 2, Passaic county, New Jersey; bids Dec. 21.

110 tons, Garden state parkway, contract No. 60, section 3, Essex county, New Jersey; bids Dec. 21.

300 tons, state bridges, Billerica-Chelmsford, Mass.; G. Rotundi & Sons, Melrose, Mass., low.

200 tons, also 75 tons of shapes, Washington state highway projects, Benton, Snohomish and Walla Walla counties; bids to Olympia, Wash., Dec. 15.

150 tons, river spans and east approach viaduct, bridge, Missouri river, Leavenworth, Kan.; bids Dec. 15, city of Leavenworth.

175 tons, three state bridges, Middletown, Conn.; bids Dec. 21, Hartford, Conn.; also 105 tons, steel piles.

165 tons, state bridge, Brookfield-Bridgewater, Conn.; bids Dec. 21 Hartford, Conn.

115 tons, two subways under and overpasses, railroad relocation, The Dalles project; bids Dec. 20 and Jan. 11 respectively to U. S. Engineer, Portland, Oreg.

113 tons, state bridge work, Allegheny county, Pennsylvania; bids Dec. 21.

100 tons, state bridges, Windsor, Conn.; bids Dec. 21, Hartford, Conn.

54 tons, also shapes, Washington state fishway and tunnel, Granite Falls, Wash.; bids to Fisheries Department, Olympia, Wash., Dec. 15.

PLATES . . .

PLATES PLACED

20,000 tons, 8-inch, seamless pipe for Alaska petroleum products line, reported placed with Jones & Laughlin Steel Corp., and National Tube Division, U. S. Steel Corp.; Williams Bros. Co., Tulsa, Okla., McLaughlin Inc., Great Falls, Mont., and Marwell Construction Co., Vancouver, B. C., joint contractors, $29,001,387.

160 tons, three pressure vessels, Texas Co., Westville, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

PLATES PENDING

625 tons, 6 underground tanks, Hanford, Wash.; Grasland Co., Inc., Bellingham, Wash., low, $1,721,815 to Atomic Energy Commission.

100 tons, or more, steel water tank, St. Petersburg, Fla., Hammond Iron Works, Warren, Pa., low.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Chicago, Milwaukee, St. Paul & Pacific, 65 diesel units, with twenty-five 1750-hp and six 1200-hp units going to Electro-Motive Division, General Motors Corp., La Grange, Ill., eight 1600-hp and five 1000-hp to American Locomotive Co., New York, eight 1600-hp and five 1200-hp units to Fairbanks, Morse & Co., Chicago, and eight 1200-hp units to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

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DEVELOPMENT BOARD
Arthur M. Field, Chief Engineer
CHARLESTON, SOUTH CAROLINA

IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commissions, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 10	$33.00
Dec. 3	34.33
Nov. avg.	35.00
Dec. 1952	43.00
Dec. 1948	43.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*$5.00-$4.00*
No. 2 heavy melting	*$0.00-$1.00*
No. 1 bundles	*$8.00-$4.00*
No. 2 bundles	*$9.00-$0.00*
No. 1 busheling	*$5.00-$4.00*
Machine shop turnings	*$9.00-$0.00*
Mixed borings, turnings	*$9.00-$0.00*
Short shovel turnings	*$2.00-$3.00*
Cast iron borings	*$1.00-$2.00*
Cut structurals	*$7.00-$8.00*
Heavy turnings	*$0.00-$1.00*
Punchings & plate scrap	*$6.00-$7.00*
Electric furnace bundles	*$7.00-$8.00*

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	37.00-38.00
Heavy breakable cast	35.00-36.00
Unstripped motor blocks	30.00-31.00
No. 1 machinery cast	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt	39.00-40.00
Rails, 2 ft. and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Rails, random lengths	43.00-44.00
Railroad specialties	41.00-42.00

Stainless Steel Scrap
(F.o.b. shipping point)

18-8 bundles & solids	165-170
18-8 turnings	90-95
430 bundles & solids	87-90
430 turnings	60-62

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*$0.00-$1.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*$0.00-$1.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*$0.00-$1.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*22.00-23.00*
Short shovel turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Low phos.	*$2.00-$3.00*
Alloy free, short shovel turnings	*24.00-25.00*
Electric furnace bundles	*$1.00-$2.00*

Cast Iron Grades

No. 1 cupola	*$2.00-$3.00*
Charging box cast	*$0.00-$1.00*
Stove plate	*$2.00-$8.00*
Heavy breakable cast	*26.00-27.00*
Unstripped motor blocks	*25.00-26.00*
Brake shoes	*$4.00-$5.00*
Clean auto cast	*$3.00-$4.00*
No. 1 wheels	*$3.00-$4.00*
Burnt cast	*$1.50-$2.50*
Drop broken machinery	*$4.00-$5.00*

Railroad Scrap

No. 1 R.R. heavy melt	*$4.00-$5.00*
R.R. malleable	*$4.00-$5.00*
Rails, 2 ft. and under	*$8.00-$9.00*
Rails, 18 in. and under	*$9.00-$0.00*
Rails, random lengths	*$1.00-$2.00*
Cast steel	*$0.00-$1.00*
Railroad specialties	*$7.00-$8.00*
Uncut tires	39.00-40.00
Angles, splice bars	*$4.00-$5.00*
Rails, rerolling	*$5.00-$6.00*

Stainless Steel
(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	nom. 50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*$2.00-$3.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*$2.00-$3.00*
No. 2 bundles	*27.00-28.00*
Machine shop turnings	*16.00-17.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Low phos.	*$4.00-$5.00*
Electric furnace bundles	*$4.00-$5.00*

Railroad Scrap

No. 1 R.R. heavy melt	*$4.00-$5.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*$4.00**
No. 2 heavy melting	*$0.00**
No. 1 bundles	*$3.00**
No. 2 bundles	*28.00*
No. 1 busheling	*$5.00*
Electric furnace bundles	*$5.00*
Machine shop turnings	*21.00*
Mixed borings, turnings	*24.00*
Short shovel turnings	*27.00*
Structurals & plate	*$6.50-$7.50*
Heavy turnings	*29.00*
Couplers, spring wheels	42.00
Rail crops, 2 ft & under	*48.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	*$8.50*
Unstripped motor blocks	28.00
Drop broken machinery	*41.00-43.00*

*Truck shipments to Conshohocken, Pa., $3 lower.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	24.00-25.00
No. 2 heavy melting	*21.50-22.00*
No. 1 bundles	24.00-25.00
No. 2 bundles	*19.50-20.00*
Machine shop turnings	*11.00-11.50*
Mixed borings, short turnings	*18.00-18.50*
Low phos. (structural & plate)	27.50
Short shovel turnings	*16.00-16.50*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00

Stainless Steel

18-8 sheets, clips, solids	165.00-175.00
18-8 bofings, turnings	85.00-90.00
430 sheets, clips, solids	80.00-85.00
410 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	*$3.00-$4.00*
No. 2 heavy melting	*$0.25-$1.25*
No. 1 bundles	*$3.00-$4.00*
No. 2 bundles	*$0.25-$1.25*
Machine shop turnings	*11.50-12.00*
Mixed borings, turnings	*14.50-15.00*
Short shovel turnings	*15.50-16.00*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	36.00-37.00

CINCINNATI

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	29.00-30.00
No. 2 bundles	23.00-24.00
No. 1 busheling	29.00-30.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	*16.00-17.00*
Short shovel turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Low phos., 1.8 in.	38.00-39.00

Cast Iron Grades

No. 1 cupola	*37.00*
Heavy breakable cast	*34.00*
Charging box cast	*34.00*
Drop broken machinery	46.00

Railroad Scrap

No. 1 R.R. heavy melt	*$3.00-$4.00*
Malleable	42.00-43.00
Rails, 18 in. and under	*46.00-47.00*
Rails, random lengths	*$8.00-$9.00*

CHICAGO

No. 1 heavy melting	*$2.00-$3.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 factory bundles	*$3.00-$4.00*
No. 1 dealer bundles	*$0.00-$1.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	33.00-34.00
Machine shop turnings	14.00-15.00
Mixed borings turnings	14.00-15.00
Short shovel turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Cut structurals, 3 ft	*$5.00-$6.00*
Punchings & plate scrap	*$6.00-$7.00*
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	*$3.00-$4.00*
Stove plate	*27.00-28.00*
Unstripped motor blocks	19.00-20.00
Clean auto cast	38.00-40.00
Drop broken machine	38.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt	34.00-35.00
R.R. malleable	40.00-41.00
Rails, 2 ft. and under	*45.00-46.00*
Rails, 18 in. and under	*47.00-48.00*
Angles, splice bars	40.00-42.00
Rails, rerolling	*46.00-47.00*

Stainless Steel Scrap

18-8 clips & solids	140.00-160.00
18-8 turnings	nom. 70.00
430 clips & solids	70.00
430 turnings	nom. 30.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 heavy melting	27.00
No. 2 heavy melting	21.00
No. 1 bundles	27.00
No. 2 bundles	21.00
No. 1 busheling	27.00
Machine shop turnings	13.00
Mixed borings turnings	13.00
Short shovel turnings	14.00
Punchings & plate scrap	29.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	30.00
Stove plate	32.00
Heavy breakable	28.00
Unstripped motor blocks	24.00
Clean auto cast	40.00
Malleable	40.00

BUFFALO

No. 1 heavy melting	*$0.00-$1.00*
No. 2 heavy melting	*27.00-27.50*
No. 1 bundles	*$0.00-$1.00*
No. 2 bundles	*25.00-25.50*
No. 1 busheling	*$0.00-$1.00*
Machine shop turnings	*17.50-18.50*
Mixed borings, turnings	*19.50-20.00*
Short shovel turnings	*20.50-21.00*
Cast iron borings	*19.50-20.00*
Low phos.	*$4.00-$5.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*$2.00-$3.00*
No. 1 machinery	*$7.00-$8.00*

Railroad Scrap

Rails, random lengths	*$7.00-$8.00*
Rails, 2 ft and under	*$2.00-$3.00*
Railroad specialties	*$0.00-$1.00*

BIRMINGHAM

No. 1 heavy melting	26.00-26.50
No. 2 heavy melting	24.00-24.50
No. 1 bundles	26.00-26.50
No. 2 bundles	22.00-22.50
Machine shop turnings	19.50-20.50
Short shovel turnings	20.50-21.50
Cast iron borings	20.50-21.50
Cut structurals	nom.
Electric furnace bundles	nom.

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	41.00-42.50
Charging box cast	30.00-31.00
Stove plate	38.00-39.00
Bar crops and plate	38.00-39.00
Cut structurals	36.00-37.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	nom.
Rails, 2-ft and under	42.00-43.00
Rails, random lengths	39.00-40.00
Angles, splice bars	38.00-39.00
Rails, rerolling	46.00-47.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*28.00*
No. 2 heavy melting	*26.00*
No. 1 bundles	*28.00*
No. 2 bundles	*24.00*
Machine shop turnings	*12.00-13.00*
Short shovel turnings	*13.00-14.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	29.00-30.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	28.00-29.00
Brake shoes	35.00-36.00
Clean auto cast	39.00-40.00
Burnt cast	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt	*$1.00*
Malleable	37.00-38.00
Rails, 18 in. and under	*44.00-45.00*
Rails, random lengths	*$8.00-39.00*
Rails, rerolling	41.00-42.00
Uncut tires	33.00-34.00
Angles, splice bars	*$5.00-$6.00*

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	*27.00*
No. 2 heavy melting	*25.00*
No. 1 bundles	24.00
No. 2 bundles	19.00
No. 3 bundles	15.00
Machine shop turnings	*12.00*
Mixed borings, turnings	*12.00*
Short shovel turnings	*12.00*
Electric furnace, No. 1	36.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	*25.00-32.00*
Unstripped motor blocks	*24.00*
No. 1 wheels	38.00-40.00
Stove plate	29.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
No. 1 busheling	24.00
Machine shop turnings	7.00
Mixed borings, turnings	7.00
Short shovel turnings	11.00
Cast iron borings	11.00
Cut structurals	28.00
Heavy turnings	11.00
Punchings & plate scrap	28.00
Electric furnace bundles	22.00

Cast Iron Grades

No. 1 cupola	39.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Machine shop turnings	7.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	40.00-41.00

HAMILTON, ONT.

(Delivered prices)

Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.00
Mechanical bundles	30.50
Mixed steel scrap	28.50
Mixed borings, turnings	26.00
Rails, remelting	32.50
Rails, rerolling	41.50
Busheling	26.50
Busheling new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	20.00

Cast Iron Grades†

No. 1 machinery cast	46.00

†F.o.b., shipping point.

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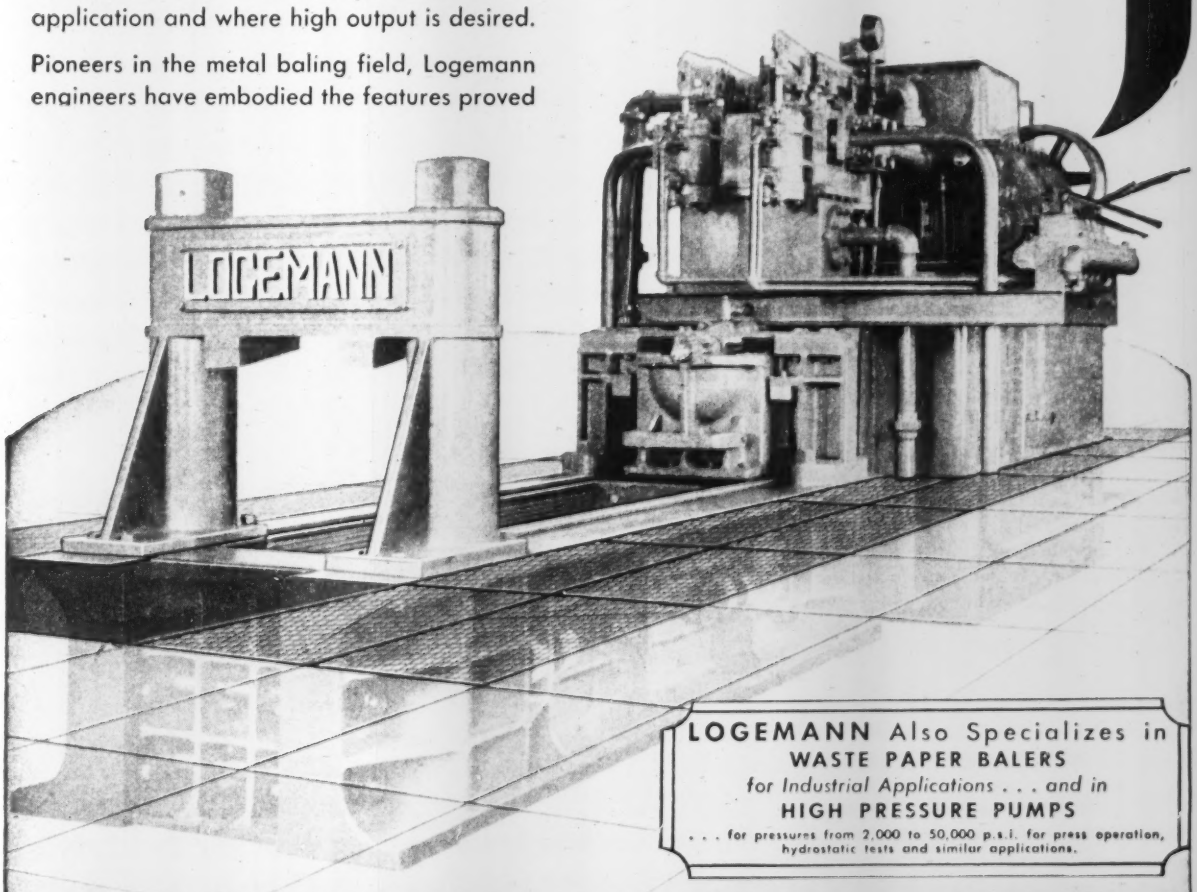

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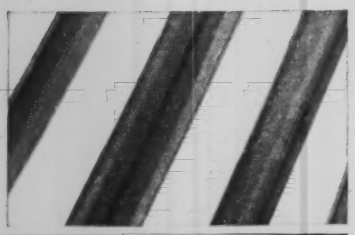

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10. Eccentric and Hydr. presses.
11. Electric welding machines.
12. Bending machines.
13. Oxy-acetylene profile cutting machines.
14. Material cutting and bolt machines.
15. Forging furnaces.
16. Forging machines.
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Tender forms, as well as "Instructions to Tenderers (Bidders), and "Conditions of Contract" may be purchased from Messrs. SWISS CAR AND ELEVATOR MANUFACTURING CORPORATION LTD., SCHLIEREN-ZURICH (Switzerland) at a ground rate of SFrs. 5 and an additional rate of SFrs. 10 per machine group, payable to the Credit Suisse Zurich (Switzerland) for account Swiss Car and Elevator Manufacturing Co., Ltd., Schlieren-Zurich. Tender forms can also be obtained from the Director, India Supply Mission, 63x F Street, Washington, D. C. after payment of dollar equivalent of Swiss Francs indicated above.

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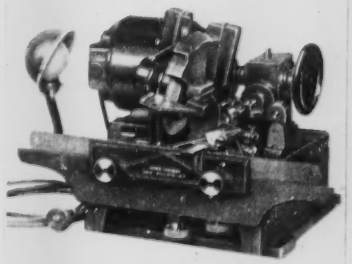

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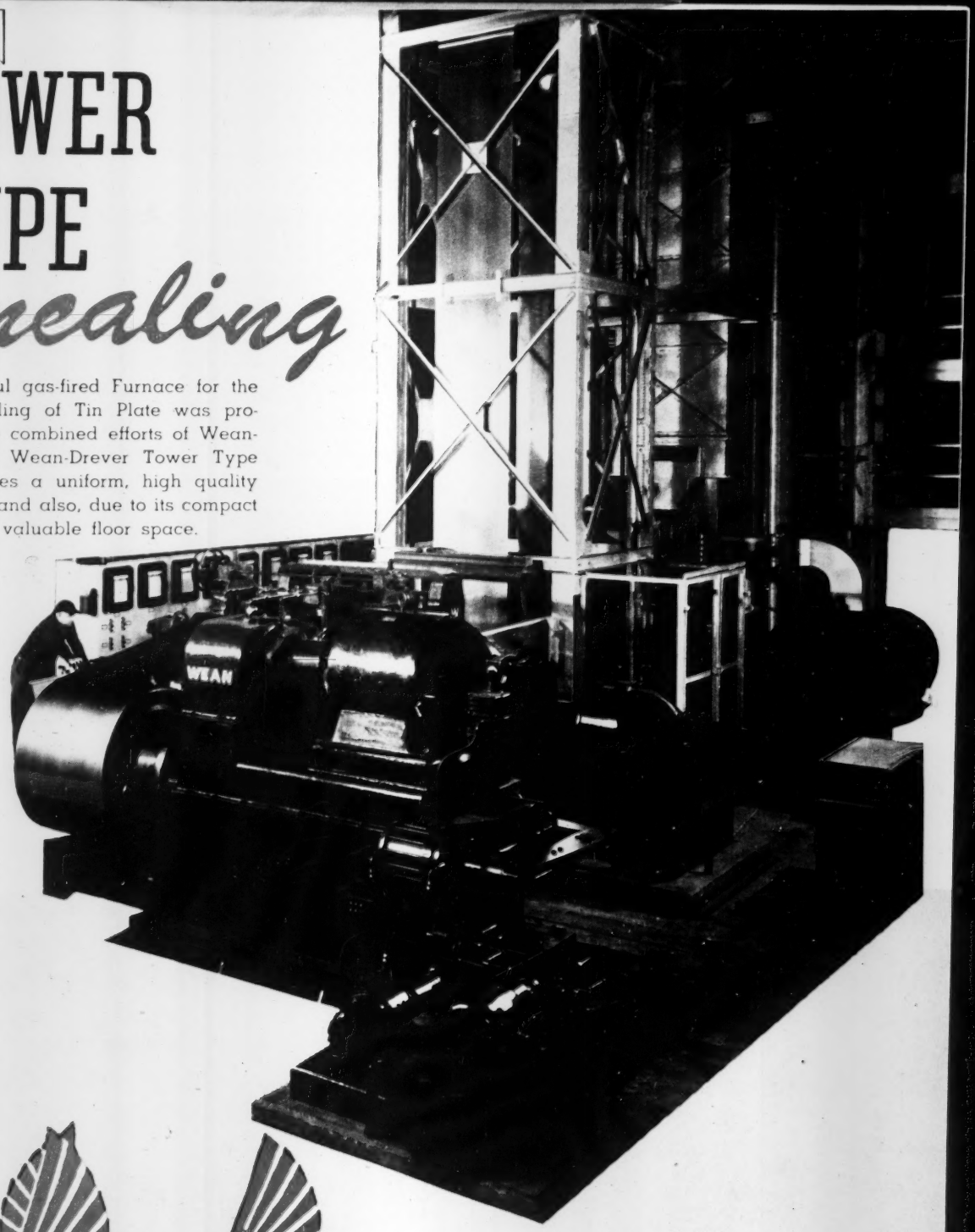

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